Animal Science Papers and Reports vol. 27 (2009) no. 2, 115-125
Institute of Genetics and Animal Breeding, Jastrzębiec, Poland

Slaughter value, meat quality and backfat fatty acid profile in Zlotnicka White and Zlotnicka Spotted fatteners

Eugenia Grześkowiak[1,*], Andrzej Borys[1], Karol Borzuta[1], Janusz T. Buczyński[2], Dariusz Lisiak[1]

[1] Meat and Fat Research Institute in Warsaw, Raw Materials and Engineering Unit, Głogowska 239, 60-111 Poznań, Poland

[2] Department of Pig Breeding and Production, University of Life Sciences in Poznań, Wołyńska 33, 60-637 Poznań, Poland

(Received November 20, 2008; accepted April 29, 2009)

Selected slaughter traits, meat quality and backfat fatty acid profile were assessed in purebred Zlotnicka White (ZW group, n=30) and Zlotnicka Spotted (ZS group, n=30) fatteners (females to castrated males ratio = 1/1). Basic physico-chemical properties were determined in the *longissimus dorsi* muscle and fatty acid profile was estimated of the backfat. At similar live weight and meat content of carcass in both breed groups, thicker backfat was recorded on the ham of the ZW and on the shoulder of the ZS pigs. The meat of both groups was characterized by good quality. Desirable meat pH, very small juice drip from the muscle tissue, high water holding capacity as well as desirable meat colour were found in both groups, although their indicators were slightly more favourable in ZW. Backfat of the ZW fatteners was found to contain by 2.59 per cent points (pp) more linoleic acid and by 0.38 pp more α-linolenic acid than ZS backfat. However, the ratio of PUFA n-6 to PUFA n-3 in the backfat was similar in both breed groups and amounted to about 10.7.

KEY WORDS: fatteners / fatty acids / meat quality / pigs / slaughter value / Złotnicka breed

Złotnicka pigs are less suitable than pigs of white breeds for commercial pork production because of their low meat content of carcass [Kapelański *et al.* 1996,

*Corresponding author e-mail: dsi.poznan@ipmt.waw.pl

2006]. However, they constitute a population of unique genetic value. Due to their propensity for fattening, the slaughter value of Zlotnicka pigs is lower than that of pigs of white breeds [Kapelański *et al*. 1996, Buczyński *et al*. 2005, Grześkowiak *et al.* 2006, Luciński *et al*. 2006]. The slaughter value of the Złotnicka pigs can be improved by crossing with high-meaty breeds, e.g. Pietrain or Hampshire [Buczyński *et al*. 1996, 2000, Michalska *et al*. 1999].

Polish meat producers are increasingly interested in offering consumers more durable and stable products commonly considered as luxurious. It is widely believed that production of fermented meat products of high sensory value requires special raw material obtained from pigs of high (about 120 kg) live body weight, fattened according to traditional (extensive) methods and supplying meat of 5.6-5.8 pH_{24}, containing approximately 3.5% intramuscular fat. This is the type of meat which can be found, among others, in Iberian pigs [Arnau 1998, Olkiewicz *et al*. 2006].

In Poland, pork raw material for the manufacture of fermented articles can be produced using domestic pig breeds, such as Puławska or Złotnicka, or their crosses with other breeds. Złotnicka pigs are registered in the herd book which is kept at the University of Life Sciences in Poznań. As it is commonly known, Złotnicka pigs of the White and Spotted strains after 13 years of breeding work were declared to constitute two separate breeds and herd books were opened for them, as it is regulated by Regulation no. 38 of the Minister of Agriculture of 27 December 1962 [Buczyński *et al* 2005a]. Due to the increasing demand for raw material for the production of traditional pork articles, there is a chance for a rapid increase of the production of these pigs in Poland.

The nutritive value of dietary fat of pork is determined by the presence of polyunsaturated fatty acids (PUFAs), particularly linoleic and α-linolenic. Apart from genetic determination, the content of dietary essential unsaturated fatty acids (EUFAs) especially long-chain acids from the n-3 family (eicosapentaenoic acid – EPA and docosahexaenoic acid – DHA) can be increased as a result of supplying the animal feeds with linseed or linseed oil [Barowicz and Kędzior 2000].

The objective of this paper was to determine the slaughter value as well as meat and fat quality of Złotnicka White and Złotnicka Spotted fatteners.

Material and methods

Used were Złotnicka White (ZW, n=30) and Złotnicka Spotted (ZS, n=30) purebred fatteners (castrated males to females ratio of 1:1). ZW pigs were kept on deep litter and fed complete rations *ad libitum*. Throughout the fattening period, the following concentrates were added to the mixture: Starter (from 20 to 30 kg), Grower (from 30 to 70 kg) and Finisher (over 70 kg).

Pigs of the ZS breed were fattened in accordance with the ecological system based on natural feeds (cereals, root crops and forages). The fattening process of the two breed groups lasted about 200 days until the animals reached the body weight of about 105 kg.

The slaughter was carried out in accordance with the technology currently employed in meat industry, using the electrical stunning. On hot, hanging left carcass-sides meat content was assessed with the IM-03 needle apparatus [Lisiak *et al.* 2006] and, using slide calliper, backfat thickness over the shoulder, back and ham at points KI, KII and KIII were measured [Borzuta 1998]. Chilled carcass-sides were divided into primary cuts following the method commonly employed in meat industry [Polish Standard PN-86-A/82002].

Meat pH of the *longissimus dorsi* (LD) muscle at the level of the last rib was measured 45 min (pH_{45}) and 24 h (pH_{24}) post-slaughter. At the same spot of the LD muscle, electrical conductivity (EC_{24}) was measured with an MT-03 conductometer and the area of the loin eye was determined. The results of pH measurements were used to calculate the proportion of carcasses with PSE ($pH_{45} \leq 5.8$) and DFD ($pH_{24} > 6.3$) meat. The following determinations were done on samples collected from the lumbar part of the LD muscle and from backfat:

– water content with the drying method [Polish Standard PN-ISO 1442];
– fat content with the Soxhlet method [Polish Standard PN-ISO 1444];
– protein content with the Kjeldahl method [Polish Standard PN-75/A-04018] using the TECATOR apparatus;
– water holding capacity (WHC) according to Grau and Hamm [1952] as modified by Pohja and Ninivaara [1957],
– natural drip from muscle tissue (samples weighing about 100 g were left in plastic foil bags for 48 hours at 4°C and the drip was calculated from the difference in weight);
– weight loss during cooking according to Baryłko-Pikielna [1975];
– meat colour using MINOLTA CHROMA METERS CR 400 determining L*, a* and b* parametres;
– marbling according to the model scale of 1 to 5 (1 point – slightly marbled, 5 points – strongly marbled).

The fatty acid profile of the backfat was determined with the gas chromatography according to Polish Standard [Polish Standard PN-ISO 5509] using a HEWLETT-PACKARD Company HP model 6890 apparatus with a flame ionization detector and high-polar column with a BPX phase (60 m × 0.25 μm × 0.25 mm). The analysis was carried out in programmed temperature and time.

The obtained results were processed statistically calculating means and standard deviations (SD). The significance of differences between means was determined employing Tukey's test [Stanisz 1998].

Results and discussion

Differences between the examined pig breed groups were identified for the slaughter value and meat and backfat quality. Both groups were characterized by similar carcass weight and meat content of carcass (about 46%). Buczyński *et al*.

[2000] and Szulc *et al*. [2006] reported slightly higher meat deposition in the ZS pigs (from about 47 to 49%). On the other hand, Kapelański *et al*. [1996], Buczyński *et al*. [1996] and Michalska *et al.* [1999] reported meat content ranging from 54 to 57% in crosses of the ZS sows with Pietrain boars. These results confirm that multi-breed crossing of pigs leads to significant increase in meat content of carcass.

Significantly thicker (by 8.13 mm) backfat on the ham was found in the ZW compared to ZS pigs, although in the latter a thicker layer (by 6.11 mm) of backfat was observed over the shoulder (Tab. 1). These observations indicate that ZS pigs were characterized by a greater subcutaneous fatness of the fore quarter than of the hind quarter of carcass. Nevertheless, the mean backfat thickness from five measurements was higher in ZW than in ZS pigs, which was also reported by Kapelański *et al*. [2006]. On the other hand, in crossbreds ZS × meaty breeds (Pietrain and Hampshire), a considerable increase in meat content and decline in carcass fatness were reported [Kapelański *et al.* 1996, Buczyński *et al*. 1996, 2001, Szulc *et al*. 2006].

A higher total yield of valuable cuts was recorded in ZW than in ZS carcasses (58.29 and 52.89%, respectively) – Table 1 (ham, shoulder, loin, neck). In ZW carcasses, higher proportions of ham, shoulder, loin and belly (by 2.92, 1.51, 1.39 and 0.73 per cent points – pp – respectively) were found. However, the yield of valuable cuts was not always related to their greater meat content. The greater proportion of

Table 1. Means and standard deviations (SD) for indicators of slaughter value and primary cuts content of carcass in Zlotnicka fatteners

Item	Złotnicka White		Złotnicka Spotted	
	mean	SD	mean	SD
Hot carcass weight (kg)	80.17	8.36	78.32	5.26
Meat content of carcass (%)	46.33	4.81	46.28	5.62
Backfat thickness (mm)				
over shoulder	43.98^{A}	7.29	50.09^{B}	8.10
on back	26,69	6,57	25,95	5,89
on cross I	36.85^{a}	6.49	32.38^{b}	6.68
on cross II	27.69^{a}	7.41	23.33^{b}	6.89
on cross III	36.94^{A}	8.65	28.81^{B}	6.37
mean for five measurements (mm)	34.73^{a}	7.34	32.11^{b}	6.75
Muscle GMP thickness (mm)	63.60	6.59	61.80	9.27
Loin eye area (cm^2)	36.20	5.85	37.45	4.98
Primary cuts (% of carcass)				
ham with shank	28.97^{A}	1.03	26.05^{B}	1.18
shoulder with shank	13.73	0.81	12.22	0.75
neck	5.53	0.51	5.95	0.47
loin	10.06^{A}	1.18	8.67^{B}	0.89
belly	14.34^{a}	1.22	13.61^{b}	1.01
Backfat (% of carcass)	11.44^{A}	2.37	8.43^{B}	1.82

$^{aA...}$Means within rows bearing different superscripts differ significantly at: small letters – P≤0.05 capitals – P≤0.01.
GMP – *m. gluteus medius*.

backfat (by 3.01 pp) found in ZW group was associated with the greater thickness of the backfat at five measurement points, especially in the hind part of the carcass. Differences noticed between groups in the content of primary cuts can, despite the similar carcass weight and meat content, be associated with the anatomical structure of animal varieties in question. Areas of the loin eye and thickness of the gluteal muscles were found similar in both Złotnicka groups.

In each breed group only one carcass with PSE meat was recorded (Tab. 2). Good meat quality of domestic pig breeds, including the ZW and ZS, was also reported by Kapelański *et al*. [2006] and Florowski *et al*. [2006] who failed to find meat with PSE type defects in the raw material derived from pigs of the mentioned breeds. This is most likely due to the fact that they are only slightly burdened with the *RYR1* gene which is responsible for the occurrence of this defect [Florowski *et al.* 2006]. Cases of the PSE meat in the Złotnicka pig reported in this study can probably be attributed to the effect of unfavourable pre-slaughter conditions, including electric stunning. In this report the lack of tendency for the PSE meat in pigs of both Złotnicka breeds is confirmed by high mean pH_{45} which exceeded 6.3 (Tab. 2).

The DFD meat ($pH_{24} > 6.3$) identified in two carcasses of the ZW breed group (Tab. 2) was the result of the pre-slaughter premature glycogen depletion in these animals which, for a variety of reasons, failed to consume their ration during last feeding. The occurrence of DFD meat under conditions of current methods of animal

Table 2. Means and standard deviations (SD) for physico-chemical traits of meat and incidence of carcasses with quality defects in Zlotnicka fatteners

Item	Złotnicka White		Złotnicka Spotted	
	mean	SD	mean	SD
pH_{45} LD	6.38	0.18	6.32	031
pH_{24} LD	5.53	0.32	5.56	0.17
EC_{24} LD	2.69^{A}	1.05	4.34^{B}	1.94
PSE meat, n (%)	1 carcass (3.33%)		1 carcass (3.33%)	
DFD meat, n (%)	2 carcasses (6.66%)		no carcasses (0%)	
Water content (%)	72.40^{A}	0.73	73.53^{B}	1.05
Fat content (%)	1.87	0.63	2.04	0.58
Protein content (%)	24.50^{A}	0.65	23.27^{B}	0.91
WHC (%)	29.88^{a}	3.69	32.07^{b}	3.20
Drip loss (%)	3.36	1.77	3.41	1.23
Cooking loss (%)	27.62^{a}	4.52	29.36^{b}	1.68
Marbling of LD (points)	2.34	0.56	2.23	0.66
Colour parametres				
L*	43.88^{A}	3.49	47.97^{B}	2.60
a*	6.27^{A}	0.8	4.73^{B}	0.98
b*	4.95	0.62	5.01	0.87

$^{aA...}$Means within rows bearing different superscripts differ significantly at: small letters – $P \leq 0.05$ capitals – $P \leq 0.01$.
PSE – pale, soft, exudative; DFD – dark, firm, dry; LD – *longissimus dorsi* muscle; WHC – water-holding capacity.

transportation where pre-slaughter rest is eliminated to maximum, is a very rare phenomenon nowadays.

High meat quality of pigs of both examined breeds was also confirmed by relatively low EC values, ranging from min. value of 1.0 to max. value of 6.5 mS (groups pooled, detailed figures not tabulated) characteristic for the raw material without quality deviations [Strzelecki *et al*. 1995, Antosik *et al*. 2003]. With regard to the remaining meat quality traits, significant differences between breed groups were found in water and protein content, WHC and colour brightness (Tab. 2). Muscles of the ZW were brighter in colour and simultaneously contained more red (a*) in the spectrum than those of ZS fatteners. In addition, ZW and ZS muscles showed, in spite of low pH_{24}, a similar and small natural drip. For comparison, even in the case of Puławska pig known to provide raw material of good WHC, the drip from the LD muscle was reported to be by about 1 pp higher (Grześkowiak *et al*. 2004). In turn, Krzęcio *et al*. [2004] found considerable variation (1-15 %) in the drip from LD muscle of fatteners derived from mass population.

In the muscles of two examined breed groups similar content of intramuscular fat was found (Tab. 2) Bearing in mind significant differences occurring between groups in backfat thickness and backfat content of carcass, ZW pig muscles were expected to contain more intramuscular fat than muscles of ZS pigs. This, however, was confirmed neither by the chemical analyses nor sensory assessment of LD marbling. Similar observations were reported by Grześkowiak *et al*. [2006] on Polish Large White × Polish Landrace fatteners from mass population.

Table 3. Correlation coefficients between quality traits of LD muscle in Zlotnicka fatteners (pooled breeds)

Trait	pH_{45}	pH_{24}	Fat content (%)	Protein content (%)
Drip loss (%)	0.06	-0.45**	-0.51**	-0.12
WHC (%)	-0.06	-0.91**	-0.59**	0.31**
Colour L*	-0.41**	-0.02	-0.24*	0.32*
Marbling (points)	0.17	0.48*	0.51**	-0.33*
EC_{24} (mS)	-0.34*	-0.44*	-0.69**	0.00
Water content (%)	-0.21	0.17*	-0.47**	-0.83**

*P≤0.05; **P P≤0.01.

Correlation coefficients between the selected meat physico-chemical traits are presented in Table 3. A significant negative correlation was estimated between pH_{24} and meat colour and EC_{24} (r=-0.41** and -0.34*, respectively). Moreover, negative and highly significant correlations were estimated between pH_{24} and the natural drip, WHC and EC_{24} (r=-045**, -0.91** and -0.44*, respectively). Water content was related negatively to the level of protein (r=-0.83**) and fat (r=-0.47**).

Fatty acid (FA) profile of backfat in ZW and ZS fatteners (as per cent of the sum of FAs) is presented in Table 4. Within saturated fatty acids (SFA) similar levels of

Table 4. Means and standard deviations (SD) for fatty acid content (% of sum of fatty acids) of backfat in Zlotnicka fatteners

Specification	Zlotnicka White		Zlotnicka Spotted	
	mean	SD	mean	SD
C10:0	0.10	0.00	0,10	0.00
C12:0	0.10	0.00	0.10	0.00
C14:0	1.26	0.11	1.30	0.11
C15:0	0.00	0.00	0.10	0.00
C16:0	23.87	0.89	23.97	0.57
C16:1	2.33^{a}	0.40	2.71^{b}	0.51
C17:0	0.32	0.06	0.46	0.08
C17:1	0.25	0.05	0.33	0.13
C18:0	13.51	1.38	13.05	1.76
C18:1	43.84^{a}	1.87	45.54^{b}	1.42
C18:2 n - 6	10.71^{A}	1.35	8.12^{B}	0.98
C18:3 n - 3 (ALA)	1.00^{a}	0.11	0.62^{b}	0.15
C20:0	0.25	0.05	0.20	0.00
C20:1	1.04^{a}	0.16	0.83^{b}	0.12
C20:2 n - 6	0.56^{A}	0.06	0.31^{B}	0.05
C20:3 n - 6	0.20	0.00	0.20	0.00
C20:4 n - 6	0.17^{A}	0.04	1.16^{B}	0.05
C20:5 n - 3 (LPA)	0.00	0.00	0.10	0.00
C22:4 n - 6	0.10^{a}	0.00	0.35^{b}	0.08
C22:5 n - 3	0.10^{a}	0.00	0.22^{b}	0.06
SFA	39.41	2.49	39.18	2.42
UFA	60.30	9.53	60.49	3.36
MUFA	47.36^{a}	2.27	49.41^{b}	2.18
PUFA	12.94^{a}	1.31	11.08^{b}	1.23
PUFA n-3	1.10	0.11	0.94	0.14
PUFA n-6	11.84^{a}	1.29	10.14^{b}	1.06
DFA	73.81	1.91	73.54	2.60
OFA	25.13	0.98	25.27	0.66
UFA/SFA	1.53		1.54	
PUFA n-6/PUFA n-3	10.73		10.78	

$^{aA...}$Means within rows bearing different superscripts differ significantly at: small letters – P≤0.05 capitals – P≤0.01.
SFA – saturated fatty acids; UFA – unsaturated fatty acids; MUFA – monounsaturated fatty acids; PUFA – polyunsaturated fatty acids; DFA – *i.e.* decreasing the cholesterol level; OFA – *i.e*. increasing the cholesterol level.

lauric (C12:0), myristic (C14:0) and palmitic (C16:0) acids were found. Backfat of ZS compared to that of ZW pigs was characterized by a slightly lower level (by 0.46 pp) of stearic acid. The content of SFA did not differ significantly between groups and amounted to about 39%. Similar levels of SFA in the backfat of crossbred pigs were reported by Wajda *et al*. [2004], Qverland *et al*. [2005] and Grześkowiak *et al*. [2008]. Pigs of groups examined in this study did not differ significantly regarding the percentage of unsaturated fatty acids (UFA – about 60%). A higher level (by 2.05

pp) of monounsaturated fatty acids (MUFA) was found in the backfat of ZS than of ZW fatteners (P≤0.05). On the other hand, levels of polyunsaturated fatty acids (PUFA) were found higher in the backfat of ZW breed group: the per cent of linolic acid (C18:2) was higher by 2.59 pp, and that of linolenic acid (C18:3) – by 0.38 pp. It can be presumed that these differences resulted from different absorption rate of acids by the gastrointestinal tract and differences in the applied feeding systems of the two groups of pigs.

In recent years food producers as well as nutritionists have become increasingly interested in lipids containing long-chain n-3 PUFA. Intensive research revealed unique salubrious properties of PUFAs from that group including the main polyunsaturated fatty acid – α-linolenic acid (ALA) and its long-chain metabolites: eicosapentaenoic acid – EPA, and docosahexaenoic acid – DHA [Ptasznik and Brzeska 2001]. The ZW backfat was found by 0.38 pp richer in the ALA than that of ZS pigs which, in turn, was characterized by the presence of the EPA (Tab. 4).

The proper ratio of PUFA n-6 to PUFA n-3 is an important indicator of the nutritive value of fat and was found very similar in the backfat of both pig groups examined in this study (10.73 in ZW and 10.78 in ZS – Tab. 4). Similar or higher values of the ratio in question were reported in pigs by Wajda *et al*. [2004] and Qverland *et al*. [2005]. Based upon the International Society for the Study of Fatty Acids and Lipids it is assumed that the ratio of n-6 to n-3 in the diet should be lower than 4, with the recommendation for increasing supply of n-3 and decreasing that of n-6 [Makała and Kern-Jędrychowski 2006]. In the human diet of West European countries, the ratio exceeds considerably the value of 10 [Barowicz and Kędzior 2000]. In the present study on two groups of pigs, a similar level of hypercholesterolemic acids (OFA, *i.e*. increasing the level of cholesterol) and hypocholesterolemic acids (DFA, *i.e.* decreasing the cholesterol level) in backfat was identified. The proportion of these acids in the backfat was similar in both groups and comparable to the values reported by Wajda *et al*. [2004] in the fat of four-breed hybrids.

Within the framework of another experiment conducted at the Meat and Fat Research Institute, fermented hams were manufactured from raw material derived from the Złotnicka White breed employing the method of dry curing with the addition of starter cultures. The obtained hams were characterized by desirable colour, flavour, palatability and texture. It was found that the raw material derived from the Złotnicka pig was suitable to produce fermented hams of high sensory quality [Olkiewicz *et al*. 2006].

Recapitulating, significant differences were identified between the two examined Zlotnicka breeds in the distribution of subcutaneous fat. At similar slaughter weight and meat content of carcass, thicker backfat was recorded on the ham of the ZW and on the shoulder of the ZS pigs. The valuable cuts content of carcass (ham, shoulder, loin and neck, pooled) was found higher in ZW than in ZS pigs (58.29% and 52.89%, respectively). Both breed groups were characterized by good meat quality. Desirable meat acidity, very small juice drip from the muscle tissue, good WHC as

well as desirable meat colour, especially in the ZW pigs, deserve special attention. As for fatty acids, by 2.59 pp more linoleic acid and by 0.38 pp more α-linolenic acid were found in the backfat of the ZW compared to that of ZS pigs. It should be assumed that the observed differences in the quality of carcasses and meat between the investigated groups of Złotnicka pigs are to a higher degree determined by the genetic background rather, than environmental factors related to a slightly different feeding system.

REFERENCES

1. ANTOSIK K., KRZĘCIO E., KOĆWIN-PODSIADŁA M., ZYBERT A., SIECZKOWSKA H., MISZCZUK B., ŁYCZYŃSKI A., 2003 – Związek przewodnictwa elektrycznego z wybranymi cechami jakości mięsa wieprzowego (The correlation between the electrical conductivity and some selected pork meat quality properties). ***Żywność-Nauka-Technologia-Jakość*****,** Suplement, 4, 37, 11-21.
2. ARNAU J., 1998 – Technologia del jamon curado en distintos paises. El jamon curado: Technologia analisis de consume. Simpsio Especial 44th ICoMST Barcelona, 9
3. BAROWICZ T., KĘDZIOR W., 2000 – Wykorzystanie pełnotłuszczowych nasion lnu oraz zróżnicowanych dawek witaminy E do modyfikacji składu chemicznego i walorów dietetycznych mięsa wieprzowego (The use of full-fat flax seeds and various witamin E doses for modifying the chemical composition and dietetic value of pork). ***Zeszyty Naukowe Przeglądu Hodowlanego*** 48, 161-174.
4. BARYŁKO-PIKIELNA N., 1975 – Zarys analizy sensorycznej żywności (Outline of the sensory evaluation of food). In Polish. WNT, Warszawa.
5. BORZUTA K., 1998 – Badania nad przydatnością różnych metod szacowania mięsności do klasyfikacji tusz wieprzowych w systemie EUROP (Studies on usefulness of different methods of meatines evaluation for the classification of porcine carcasses in the EUROP system). In Polish, summary in English. ***Roczniki Instytutu Przemysłu Mięsnego i Tłuszczowego.*** Rozprawy 35, 2, 1-83.
6. BUCZYŃSKI J., T., KRUPIAK S., DUDZIAK P., 1996 – Wyniki krzyżowania loch w.b.p z knurami rasy pietrain, pietrain x p.b.z. i pietrain × złotnicka pstra (Results of mating Polish Large White sows with pietrain, pietrain × Polish landrace and pietrain × złotnicka spotted boars). In Polish. ***Zeszyty Naukowe Przeglądu Hodowlanego*** 26, 161-167.
7. BUCZYŃSKI J.T., SZULC K., FAJFER E., PASZEK A., DRYMEL W., ŁUKOMSKI W., LUCIŃSKI P., 2000 – Jakość tuczników mieszańców pochodzących z krzyżowania knurów Hampshire i WBP lochami rasy złotnickiej pstrej (Quality of crossbred fatteners from the crossing of Hampshire and WBP boars with Złotnicka Spotted sows. ***Roczniki Naukowe Zootechniki*****,** Supplement 5, 68-73.
8. BUCZYŃSKI J.T., BORZUTA K., SZULC K., 2001 – Carcass quality in Złotnicka Spotted hybrid pigs. ***Annals of Animal Science,*** Supplement 1, 13-17.
9. BUCZYŃSKI J.T., PANEK A., LUCIŃSKI P., SKRZYPCZAK E., SZULC K., 2005 – The effect of genotype on fattening and slaughter performance in pigs. ***Annals of Animal Science*****,** Supplement,1, 11-15.
10. BUCZYŃSKI J.T., SZULC K., LUCIŃSKI P., 2005a – Program hodowlany ochrony zasobów genetycznych świń rasy złotnickiej białej i złotnickiej pstrej, Maszynopis.
11. FLOROWSKI T., PISULA A., BUCZYŃSKI J.T., ORZECHOWSKA B., 2006 – Częstotliwość występowania wad mięsa wieprzowego różnych ras hodowlanych w Polsce (Frequency of occurrence of pork quality defects in meat from different breeds reared in Poland). ***Roczniki Naukowe Polskiego Towarzystwa Zootechnicznego*** 2 (2), 91-97.

12. GRAU R., HAMM R., 1952 – Eine enfache Metchode zur Bestimmung der Wasserbindung in Fleisch. ***Fleischwirtschaft***, 4, 295-297
13. GRZEŚKOWIAK E., BORZUTA K., BORYS A., 2004 – Meat quality of Puławska fatteners from the current market. ***Animal Science Papers and Reports*** 22, Supplement 3, 107-112.
14. GRZEŚKOWIAK E., BORZUTA K., STRZELECKI J., 2006 – Influence of weight of PLW × PL pig carcasses from the mass population on meatiness, fatness and meat quality. ***Annals of Animal Science*****,** Supplement 2,2, 331-334
15. GRZEŚKOWIAK E., ZAJĄC T., BORZUTA K., ZAJĄC P., TRATWAL Z., LISIAK D., STRZELECKI J., 2008 – Badanie wpływu dodatku do paszy preparatu z nasion lnu na wartość rzeźną tusz oraz jakość mięsa i tłuszczu (Investigation on the effect on the addition to feed of a preparation oil flax on slaughter value and carcass meat and fat quality). ***Roczniki Instytutu Przemysłu Mięsnego i Tłuszczowego*** XLVI/2, 7-20.
16. KAPELAŃSKI W., RAK B., BOCIAN M., DYBAŁA J., 1996 – Ocena umięśnienia tusz świń mieszańców z różnym udziałem rasy pietrain i złotnickiej pstrej (Carcass meat content evaluation in pigs with different proportion of petrain and złotnicka spotted breeds). ***Zeszyty Naukowe Przeglądu Hodowlanego*** 26, 129-134.
17. KAPELAŃSKI W., BUCZYŃSKI J.T., BOCIAN M., 2006 – Slaughter value and meat quality in the Polish native Złotnicka spotted pig. ***Animal Science Papers and Reports*** 24, Supplement 1, 7-13.
18. KRZĘCIO E., KOĆWIN-PODSIADŁA M., ZYBERT A., SIECZKOWSKA H., ANTOSIK K., MISZCZUK B., WŁODAWIEC P., 2004 – Charakterystyka jakości tusz i mięsa tuczników o zróżnicowanym wycieku naturalnym z tkanki mięśnia *longissimus lumborum* (The characteristic of carcass and meat quality of fatteners differentiated by drip loss from *longissimus lumborum* muscle tissue). ***Zeszyty Naukowe Przeglądu Hodowlanego*** 72 (2), 143-150.
19. LISIAK D., BORZUTA K., BORYS A., STRZELECKI J., GRZEŚKOWIAK E., PIOTROWSKI E., KIEN S., 2006 – Nowy polski aparat do klasyfikacji tusz wieprzowych IM-03 (New Polish apparatus IM-03 for classification of pig carcasses). ***Gospodarka Mięsna*** 4, 34-35.
20. LUCIŃSKI P., BUCZYŃSKI J.T., PANEK A., 2006 – Fattening and slaughter performance of Polih Landrace and Polish Large White breeding gilts. ***Annals of Animal Science,*** Suplement 2, 369-373.
21. MAKAŁA H., KERN-JĘDRYCHOWSKI J., 2006 – Ocena modelowych przetworów mięsnych z dodatkiem olejów z ryb w aspekcie charakterystyki profilu kwasów tłuszczowych i przebiegu zmian oksydacyjnych (Role of fish oil employed in model meat product in aspect of improvement of fatty acid profile and run of oxidative changes). ***Roczniki Instytutu Przemysłu Mięsnego i Tłuszczowego*** XLIV (2), 117-129.
22. MICHALSKA G., NOWACHOWICZ J., RAK B., 1999 – Mięsność knurków mieszańców po ojcach rasy pietrain i matkach różnych ras i linii świń (Lean content in crossbred boars by pietrain sires and out of sows of different breeds and lines). ***Roczniki Naukowe Zootechniki,*** Supplement 3, 159-163.
23. OLKIEWICZ M., MOCH P., MAKAŁA H., 2006 – Charakterystyka szynek surowych dojrzewających, wyprodukowanych z surowca pochodzącego od wybranych prymitywnych ras polskich (Characteristics of hams ripening in raw state produced from raw material comig from selected primitive Polish breeds). ***Roczniki Instytutu Przemysłu Mięsnego i Tłuszczowego*** XLIV (2), 131-140.
24. Polish Standard PN-86/A-82002, 1986 – Wieprzowina. Podział tusz na części zasadnicze.
25. Polish Standard PN-ISO 1442, 2000 – Mięso i przetwory mięsne. Oznaczanie zawartości wody.
26. Polish Standard PN-ISO 1444, 2000 – Mięso i przetwory mięsne. Oznaczanie zawartości tłuszczu wolnego.

27. Polish Standard PN-75/A-04018, 1975 – Produkty rolno-spożywcze. Oznaczanie zawartości azotu metodą Kjeldahla i przeliczanie na białko.
28. Polish Standard PN-ISO 5509, 1996 – Oleje i tłuszcze roślinne oraz zwierzęce. Przygotowanie estrów metylowych kwasów tłuszczowych.
29. POHJA N.S., NIINIVAARA F.P., 1957 – Bestimmung der Wasserbindung des Fleisches mittels der Konstantdrűckmethods. ***Fleischwirtschaft*** 9, 193-195.
30. PTASZNIK S., BRZESKA M., 2001 – Wybrane aspekty enzymatycznej restrukturyzacji triacylogliceroli zawierających długołańcuchowe polienowe kwasy tłuszczowe z grupy n-3 (Selected aspects of enzymatic restructurization of triacylglycerols containing longchain n-3 polyunsaturated fatty acids). ***Roczniki Instytutu Przemysłu Mięsnego i Tłuszczowego*** XXXVIII**,** 157-170.
31. QVERLAND M., KJOS N.P., OLSEN E., 2005 – Changes in fatty acid composition and improved sensory quality of backfat and meat of pigs fed bacterial protein meal. ***Meat Science*** 71, 719-729.
32. STANISZ A., 1998 – Przystępny kurs statystyki w oparciu o program STATISTICA PL na przykładach z medycyny. Startsoft Polska Sp. z o.o. Kraków**.**
33. STRZELECKI J., BORZUTA K., PIECHOCKI T., GRZEŚKOWIAK E., 1995 – Określenie parametrów przewodności elektrycznej mięsa wieprzowego różnej jakości (Determination of electrical conductivity parameters of pig meat of different quality). ***Zeszyty Naukowe Przeglądu Hodowlanego*** 20, 89-100.
34. SZULC K., BUCZYŃSKI J.T., SKRZYPCZAK E., PANEK A., 2006 - Live testing results of złotnicka spotted (ZS), ZS × Polish Large White and ZS × Hampshire fatteners. ***Animal Science Papers and Reports*** 24, Supplement, 65-69.
35. WAJDA S., DASZKIEWICZ T., BORZUTA K., GRZEŚKOWIAK E., 2004 – Carcass traits, meat quality and fatty acid profile of backfat in fatteners fed diet supplemented with the APC premix. ***Animal Science Papers and Reports*** 22, Supplement 3, 211-217.

Eugenia Grześkowiak, Andrzej Borys, Karol Borzuta,
Janusz T. Buczyński, Dariusz Lisiak

Wartość rzeźna, jakość mięsa i profil kwasów tłuszczowych słoniny świń ras złotnickiej białej i złotnickiej pstrej

S t r e s z c z e n i e

Oceniono wybrane cechy wartości rzeźnej oraz jakości mięsa i tłuszczu słoniny czystorasowych tuczników ras złotnickiej białej i złotnickiej pstrej *(Zlotnicka White* – ZW i *Zlotnicka Spotted* – ZS). Oznaczono podstawowy skład chemiczny i wskaźniki fizykochemiczne mięśnia najdłuższego grzbietu i określono profil kwasów tłuszczowych w słoninie grzbietowej. Przy zachowaniu podobnej ubojowej masy ciała i zbliżonej zawartości mięsa w tuszach obu grup grubszą słoninę stwierdzono na szynce świń rasy ZW, natomiast na łopatce – świń rasy ZS. Mięso tuczników badanych ras charakteryzowało się dobrą jakością, a zwłaszcza pożądanym zakwaszeniem, małym wyciekiem naturalnym, dobrą wodochłonnością i pożądaną barwą, przy czym cechy te były nieco korzystniejsze w przypadku świń rasy ZW. Spośród kwasów tłuszczowych, w słoninie świń ZW notowano o 2,59 punktów procentowych (pp) więcej kwasu linolowego i o 0,38 pp kwasu linolenowego. Natomiast stosunek kwasów PUFA n-6 do PUFA n-3 w słoninie obu ras był podobny – około 10.7.