CARCASS MARKET VALUE OF FATTENER GILTS AND PRIMIPAROUS GILTS

WARTOŚĆ HANDLOWA TUSZ LOSZEK TUCZNIKÓW I LOSZEK PIERWIASTEK

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ABSTRACT

Study comprised 60 crossbred gilts F_1 (PLW x PL), 30 fattener gilts (A) and 30 littermate primiparous gilts (B). The fattening was conducted in standard condition from 30 to 108 kg body weight. The primiparous gilts were mated at second oestrus. During pregnancy and lactation period they were reared in standard condition adopted for pregnant and lactating sows. Fattener sows as well as primiparous sows were slaughtered after end of the experiment. Market carcass value was estimated on carcass jointing basis. It was assumed that market value is a function of percentage share of main parts in carcass and their unitary price (PLN/kg). Market carcass value of fattener sows and primiparous sows counted on 100 kg was comparable.

KEYWORDS: carcas market value, fattener gilts, primiparous gilts

STRESZCZENIE

Badaniami objęto 60 loszek, mieszańców F_1 rasy polskiej białej zwisłouchej i wielkiej białej polskiej, w tym 30 loszek tuczników (A) i 30 loszek pierwiastek ubijanych po odchowaniu pierwszego miotu. Tucz prowadzono w warunkach chowu tradycyjnego od masy ciała 30 kg do około 107 kg. Loszki pierwiastki zostały pokryte w drugiej rui. W okresie ciąży i po oproszeniu utrzymywane były w warunkach standardowych dla loch prośnych i karmiących. Zarówno loszki tuczniki jak i loszki pierwiastki zostały poddane ubojowi oraz ocenie jakości tusz. Wyliczono udział procentowy poszczególnych elementów rozbioru w tuszy. Przy ocenie wartości handlowej tusz przyjęto założenie, że jest ona funkcją masy uzyskanych elementów w odniesieniu do ich procentowego udziału oraz ceny jednostkowej (zł/kg). Wartość handlowa tusz loszek tuczników i loszek pierwiastek w przeliczeniu na 100 kg była porównywalna.

SŁOWA KLUCZOWE: wartość handlowa, loszki tuczniki, loszki pierwiastki

STRESZCZENIE SZCZEGÓŁOWE

Celem badań było określenie wartości handlowej tusz loszek tuczników i loszek pierwiastek przez porównanie udziału poszczególnych elementów zasadniczych uzyskanych z rozbioru. Badaniami objęto łącznie 60 loszek, mieszańców F_1 rasy polskiej białej zwisłouchej i wielkiej białej polskiej, 30 loszek tuczników (A) i 30 loszek pierwiastek (B). Loszki z grupy A poddano tuczowi w zakresie masy ciała 30-108 kg. Tucz przeprowadzono w warunkach chowu tradycyjnego, w ujednoliconych warunkach utrzymania, pielęgnacji i żywienia. Zastosowano żywienie na mokro, z koryt zgodnie z Normami Żywienia Świń [17]. Loszki pierwiastki zostały pokryte podczas drugiej rui. W okresie ciąży i po oproszeniu utrzymywane były w warunkach standardowych dla loch prośnych i karmiących. Żywione były dietą standardowa, zgodną z polskimi normami i zaleceniami dla tej grupy zwierząt [17]. Po oproszeniu i odchowie prosiąt poddano je ubojowi. Ubój zwierząt i ocenę tusz przeprowadzono w Zakładach Mięsnych w Bydgoszczy zgodnie z zasadami obowiązującymi w przemyśle mięsnym [20]. Wyliczono udział procentowy poszczególnych elementów rozbioru w tuszy. Przy ocenie wartości handlowej tusz przyjęto założenie, że jest ona funkcją uzyskanych elementów w odniesieniu do ich procentowego udziału oraz ceny jednostkowej (zł/kg). W pracy przeprowadzono kalkulację cen elementów zasadniczych w półtuszach badanych grup świń, w której uwzględniono ceny hurtowe obowiązujące w Zakładach Mięsnych w styczniu 2010 r. Badane grupy zwierząt różniły się wiekiem w dniu uboju oraz masą ciała przed ubojem. Mięsność i wydajność rzeźna obu grup kształtowała się na zbliżonym poziomie 52,79% i 79,55% u tuczników oraz 53,36% i 80,35% u pierwiastek. Cieńszą słoniną cechowały się tusze loszek pierwiastek (20,0 mm) wobec loszek z tuczu standardowego (24,0 mm). Analiza porównawcza wykazała, że średnia masa elementów otrzymanych z półtusz loszek pierwiastek była istotnie większa niż elementów pochodzących z półtusz loszek tuczników. W przypadku najcenniejszych elementów różnice wynosiły: dla szynki 4,46 kg, dla karkówki 2,09 kg, dla polędwicy 1,97 kg. Natomiast ich procentowy udział w tuszy był zbliżony wskutek tego wartość handlowa tusz tuczników i loszek pierwiastek w przeliczeniu na 100 kg była porównywalna i wynosiła odpowiednio: 821,42 zł i 820,29 zł.

INTRODUCTION

The dominant source of meat and meat products for consumption purposes in Poland are porkers, which constitute the end product of the fattening process of pigs [4]. Pork is the most frequently consumed meat in our country and in terms of quantities, it has remained at a level of approximately 40 kg per citizen for several years [7], which constitutes nearly 60% of the meat consumption in general [1]. The 2010 forecasts anticipate that this consumption volume is to increase to 45 kg [19].

That is why it is of primary importance to produce fatteners with high quality of meat, adequate proportion of valuable sections obtained from the carcass division and a larger processing capacity [13]. The average meatiness of fatteners in the year 2007 amounted to 53.8% and was higher by 0.7% compared to the year 2006 [22]. The

settlement between meat processing plants and the respective producers delivering fatteners to slaughter is based on the specific meatiness of carcasses. A different settlement principle is followed in case of producers delivering sows to slaughter, the carcases of which are not subject to classification. This particular commercial group involves the purchase of multiparous sows as well as animals ordered for slaughter following the first litter [23]. These gilts constitute valuable material that, apart from the beneficial litter of piglets for fattening, may also provide us with exceptionally useful and low-fat carcass material [9].

The correlations between the tissue composition of pork carcasses and their processing capacity and commercial value have been known for a long time [3]. The commercial value of pork carcasses is not fixed and changes in time. This particular parameter depends on the weight of the carcass, the meatiness thereof as well as the percentage of the most valuable cuts and the unit prices for individual sections of the carcass [18].

The purpose of this study was to compare the percentage of individual major cuts obtained from the division of pork carcasses acquired from fattening gilts and first farrowing gilts as well as to establish the commercial value of the carcasses.

MATERIAL AND METHODS

The research was carried out at a breeding piggery on one of the farms of the kujawsko -pomorskie province. The scope of the study covered 60 gilts, F_1 crossbreeds of Polish Landrace and Polish Large White breeds, which were divided in two groups (A and B). The gilts in both groups came from 20 litters. Group A comprised of gilts obtained from a standard fattening, whereas group B included gilts slaughtered following the first littering (first farrowing gilts).

In the case of fattening gilts, the fattening process began at the age of approx. 3 months and at a weight of 30 kg and was concluded upon reaching a body weight of approx. 107 kg. The fatteners were kept in pig pens, in groups of 10 (1.2 m^2 per 1 gilt) and wet-fed from troughs [17].

The first farrowing gilts mated in the second heat. During pregnancy and following littering, the gilts were kept in standard conditions for mated and nursing sows. Feeding frequency was regulated in accordance with Pig Feeding Standards published by the Institute of Animal Physiology and Nutrition in Jabłonna (1993). Following pregnancy, farrowing and rearing, the gilts were slaughtered.

The animal slaughter and subsequent evaluation of carcasses were carried out at the Meat Processing Factory in Bydgoszcz. Chilled half carcasses were divided into major cuts in accordance with the method applicable in the meat industry as per PN-86-A/82002. All sections were weighed to an accuracy of 1 g, with subsequent calculation of their percentage share in the half carcass. During the process of assessing the commercial value of carcasses, an assumption was made that the

commercial value of a carcass shall constitute a function of weight of the division cuts obtained from the given carcass, including their percentage share in the carcass as well as the applicable unit price (PLN/kg). The study involved calculation of prices for the major sections in the half carcasses from the analysed groups of pigs, based on the wholesale prices paid by Meat Processing Plants, effective in January 2010. Obtained results were processed statistically. Significance of differences between the studied groups was estimated with the aid of Duncan's test, using the STATISTICA 8 PL [21] computer software.

RESULTS

Table 1 presents the carcass properties of the analysed gilts. The fattening gilts and first farrowing gilts subject to comparison differed in terms of age at slaughter as well as body weight (P≤0.01). Highly significant differences also occurred with regard to warm and cold carcass weight. The weight of half carcasses from the first farrowing gilts was higher than in the case of fattening gilts, which was confirmed as a highly statistically significant difference (P≤0.01). Both groups demonstrated similar carcass yield and meat content in the carcass. The average backfat thickness from 5 measurements was significantly lower in case of the first farrowing gilts (P≤0.05).

Table 1. Some important carcass characteristics
Tabela 1 Ważniejsze cechy użytkowości rzeźnej

Trait	Group A Standard fattened gilts	B Primiparous gilts
Number, n	30	30
Age at slaughter, days	178,63B ± 10,17	386,73A ± 25,30
Body weight at slaughter, kg	107,40 B ± 5,96	156,23 A ± 20,90
Hot carcass weight, kg	85,46 B ± 5,37	125,72 A ± 18,94
Colt carcass weight, kg	83,67 B ± 5,33	123,13 A ± 18,53
Half carcass weight, kg	41,62 B ± 2,64	61,20 A ± 9,80
Killing-out yield (%)	79,55 ± 1,45	80,35 ± 2,52
Carcass lean content, ULTRA-Fom (%)	52,79 ± 3,84	53,36 ± 4,18
Average backfat thinckness from 5 measurments, mm	24,10 b ± 0,53	20,00 a ± 0,67

A, B – P≤0,01; a,b – P≤0,05

Table 2 presents a summary of weight and percentage values of primary sections in half carcasses obtained from the analysed groups of pigs. The weight of the primary sections in half carcasses from the first farrowing gilts was significantly higher than the weight of the same sections coming from the half carcasses of the fattening gilts (P≤0.01). The percentage share of the most valuable cuts (shoulder, loin, ham and bacon) in both analysed gilt groups was similar. The only highly significant differences occurred in case of the shoulder (P≤0.01).

Table 2. Weight and yield of primary cuts in half-carcasses of studied pig groups
Tabela 2 Masa i udział elementów zasadniczych w półtuszach badanych grup świń

Trait	Group A Standard fattened gilts	B Primiparous gilts
Neck, kg	2,82B ± 0,28	4,91A ± 0,72
Neck, %	6,74B ± 0,43	8,07A ± 0,83
Schoulder, kg	6,55B ± 0,45	9,99A ± 1,34
Schoulder, %	15,93 ± 0,78	16,41 ± 0,99
Loin, kg	4,53B ± 0,46	6,50A ± 1,34
Loin, %	10,91 ± 1,11	10,59 ± 0,97
Ham, kg	10,97B ± 0,84	15,43A ± 2,34
Ham, %	25,75 ± 1,10	25,25 ± 1,14
Belly, kg	3,72B ± 0,43	4,87A ± 0,91
Belly, %	8,70 ± 0,90	7,93 ± 0,56

A, B – P≤0,01

Table 3. Primary cuts price calculation for half-carcasses standard fattened gilts
Tabela 3 Kalkulacja cen elementów zasadniczych uzyskanych z półtuszy loszek tuczników

Trait	Weight (kg)	Share (%)	Price (PLN/kg)	Market value (PLN)
Neck	2,82	6,74	10,40	70,09
Schoulder	6,55	15,93	8,90	141,77
Loin	4,53	10,91	15,49	168,99
Ham	10,97	25,75	13,90	357,92
Belly	3,72	8,70	9,50	82,65
Other cuts	13,03	31,97	-	-
Total	41,62	100	-	821,42

Tables 3 and 4 present the calculation for the prices of primary sections obtained from the fattening and first farrowing gilts. These data demonstrate that the percentage share of primary sections with high commercial value remains at the same level in both analysed groups of pigs.

Table 4. Primary cuts price calculation for half-carcasses primiparous gilts
Tabela 4 Kalkulacja cen elementów zasadniczych uzyskanych z półtuszy loszek jednorazówek

Trait	Weight (kg)	Share (%)	Price (PLN/kg)	Market value (PLN)
Neck	4,91	8,07	10,40	83,92
Schoulder	9,99	16,41	8,90	146,04
Loin	6,50	10,59	15,49	164,03
Ham	15,43	25,25	13,90	350,97
Belly	4,87	7,93	9,50	75,33
Other cuts	19,5	31,75	-	-
Total	61,20	100	-	820,29

DISCUSSION

The groups of animals subject to research differed in terms of age at slaughter and body weight prior to slaughter. The age of the first farrowing gilts was twice as high as the age of the gilts coming from traditional fattening (386.73 days and 178.63 days, respectively); P≤0.01. At the same time, these animals were characterized by higher body weight prior to slaughter (156.23 kg for group B and 107.40 kg for group A); P≤0,01 as well as the warm and cold carcass weight (125.72 kg and 123.13 kg for group B, compared to 85.46 kg and 83.67 for group A); P≤0,01. Similar results with regard to the properties of first farrowing gilt carcasses were also obtained by Kapelańska et al. [8] and Kapelański et al. [10].

It is important to emphasise the high carcass yield amounting to 79.55% in the fattening gilts and 80.35% in the first farrowing gilts. A slightly higher value with regard to carcass yield (81.78%) of fatteners was arrived at by Bąk and Denaburski [2] in pigs of similar conformation to the wbp and pbz breeds. Lower results have been anticipated with regard to the first farrowing gilts, in connection with the effect of reproductive organs on their body weight. This possibility was suggested by the results of research conducted by Fandrejewski and Raj [6] who proved that first farrowing and multiparous gilts demonstrated lower carcass yield compared to control sows fattened up to the same body weight. Similar values with regard to this particular attribute were also obtained in other studies [8, 11, 12].

The meat content in the carcasses of fatteners constitutes one of the most important parameters taken into account in production economics analyses of both livestock and meat as well as during assessment of the quality of raw meat material [15]. The percentage of meat content in carcass established following the slaughter with the use of ULTRA-FOM 100 device did not differ between the analysed groups, amounting to 52.79% in case of the fattening gilts and 53.36% in the first farrowing gilts. The meatiness of the analysed gilts was comparable with the meatiness of fatteners, crosses between the same breeds (wbp x pbz), resulting from an experiment by Ksobiak et al. [14].

Analysis of carcass fatness, expressed as the average backfat thickness from five measurements, showed a significantly lower value for this parameter in case of the first farrowing gilts (20.00 mm) compared to the fattening gilts (24.10 mm). Similar results were obtained in the research by Kapelański et al. [12] carried out on first farrowing gilts divided into three groups that differed in terms of body weight losses during the 21-day lactation period. In an experiment by Ksobiak et al. [14], carried out on F_1 crossbreed fatteners, the backfat thickness in 5 points was similar to that measured in the course of this study and amounted to 24.60 mm.

Pork carcasses with larger meat content are of high commercial value to the meat industry [5]. Boosting commercial value of carcasses by increasing meatiness and thus the percentage of muscle tissue in individual carcass cuts, results in an increase in percentage share of valuable sections such as loin, ham or shoulder, which is confirmed by a number of studies, including the research by Wajda et al. [24]. First farrowing gilts were characterized by a significantly higher weight of the primary sections, i.e. the neck, shoulder, loin, ham and bacon (respectively: 4.91 kg; 9.99 kg; 6.50 kg; 15.43 kg and 4.87 kg) compared to fattening gilts (respectively: 2.82 kg; 6.55 kg; 4.53 kg; 10.97 kg and 3.72 kg). However, the percentage share of primary sections in carcasses from both gilt groups was similar and highly significant differences were revealed with regard to the neck only (tab. 2).

The percentage share of the major carcass cuts from the shoulder, loin, ham and bacon was similar in both analysed groups (group A: 15.93%, 10.91%, 25.75% and 8.70%; group B: 16.41%, 10.59%, 25.25% and 7.93%), as was in the case of the resulting commercial value thereof (PLN 141.77, PLN 168.99, PLN 357.92, PLN 82.65; compared to PLN 146.04,
PLN 164.03, PLN 350.97, PLN 75.33) (tab. 3 and 4). First farrowing gilts demonstrated higher weight (4.91 kg) and percentage share (8.07%) of the neck, compared to the fattening gilts (2.82 kg and 6.74%, respectively). Considering the above, the neck of the first
farrowing gilts proved to be of more commercial value (PLN 83.92), compared to that of the fattening gilts (PLN 70.09). The commercial value of carcasses from the fatteners and first farrowing gilts per 100 kg was comparable and amounted respectively to:
PLN 821.42 and PLN 820.29.

The results obtained show that both the fattening gilts as well as first farrowing gilts are characterized by high percentage share of the most valuable sections of carcass that are also of highest commercial value. That is why the production of pork based on first farrowing gilts is entirely practical. The proposed use of gilts slaughtered following the rearing of their first litter may provide an excellent alternative to the production of meat based on traditional fattening procedures. With the application of the new practices, a supply of less expensive pork, fully useful for the purposes of meat processing, is only to be expected.

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