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Katedra Hodowli i Technologii Produkcji Trzody Chlewnej
Uniwersytetu Przyrodniczego w Lublinie,
ul. Akademicka 13, 20-950 Lublin
e-mail: markba@poczta.onet.pl

MAREK BABICZ, PIOTR KAMYK, ANDRZEJ STASIAK

Evaluation of slaughter value of fatteners slaughtered in the Lubelszczyzna region in 2005–2006

Ocena wartości rzeźnej tuczników ubijanych na Lubelszczyźnie w latach 2005–2006

Summary. The studies included carcasses of porkers purchased in the Lubelszczyzna region; the data covered the years 2005–2006. Estimation of carcass quality was based on the muscling and adiposity measurements carried out by an ultrasound unit Ultra-Fom 300. The gathered material was sorted out according to a quarter of purchase and carcass mass. In the estimated years, the mean carcass meatiness averaged 51.15%. Carcass quality expressed as thickness of backfat and loin eye height in carcasses obtained in the successive years showed some changes subject to a quarter of the year studied. The majority of the evaluated carcasses ranged between 80–90 kg BW interval.

Key words: pork, slaughter value, backfat thickness, loin eye height

INTRODUCTION

Implementation of the regulatory post mortem classification of porcine carcasses proved to be one of the crucial factors leading to increased meatiness of Polish fatteners as well as more uniform slaughter material [Borzuta *et al*. 2004, Koćwin-Podsiadła and Antosik 2001, Wajda *et al*. 1997].

Recently, pork production in Poland has been marked with relative stagnancy and substantial variations in demand. A fall of swine purchase price concurrent with increased cereal price implicated a gradual depression in profitability of pig fattening [Fizyczne rozmiary... 2007]. This status is reflected in the operations of small-scale meat processing enterprises which are forced to reduce their production owing to limited access to raw material. The large-scale pork processors, however, have remained very active in the processed meat sector as they possess the reliable and guaranteed raw meat base.

The objective of the present research was the quantitative and qualitative analysis of carcasses obtained in the successive quarters of the year as well as determination of changes in slaughter value of porkers presented for slaughter at various body weight in a chosen meat plant in the Lubelszczyzna region.

MATERIAL AND METHODS

The analysis included 529 582 carcasses of fatteners purchased in the Lubelszczyzna region. The collected data covered the years 2005–2006. The porkers were slaughtered in the meat plant in compliance with the legal requirements in meat industry.

Carcass quality was estimated on the grounds of the muscling and adiposity measurements performed with an ultrasound unit Ultra-Fom 300 for grading individual parts of the carcass. The gathered material was sorted subject to a quarter of the purchase year and porker slaughter: I (January, February, March), II (April, May, June), III (July, August, September), IV (October, November, December) and carcass mass: 60.0–70.0 kg, 70.0–80.0 kg, 80.0–90.0 kg, 90.0–100.0 kg, 100.0–110.0 kg, 110.0–120.0 kg.

The results were analyzed statistically using STATISTICA 6.0 program. Significances of differences were determined by means of one-factor analysis of variance.

RESULTS

The number of carcasses obtained in the meat plant ranged from 241.7 thousand in 2005 up to 287.9 thousand in 2006 (Tab. 1).

Table 1. Characteristics of quality of carcasses obtained in 2005–2006
Tabela 1. Charakterystyka jakości tusz pozyskiwanych w latach 2005–2006

Year Rok	Number of carcasses Liczba tusz	Carcass mass, kg Masa tuszy, kg		Backfat thickness, mm Grubość słoniny, mm		Loin eye height, mm Wysokość „oka" polędwicy, mm		Carcass Meatiness, % Mięsność tuszy, %	
		$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
2005	241 702	85.04	10.72	19.31	5.93	52.39^{A}	6.66	50.86^{A}	5.37
2006	287 880	85.44	10.97	19.31	6.13	53.04^{B}	6.73	51.45^{B}	4.87

A, B – differences significant at $P \leq 0.01$
A, B – różnice istotne statystycznie przy $P \leq 0{,}01$

In the analyzed years, the carcass mass remained at a similar level (85.04–85.44 kg), but carcass quality, as regards the muscle tissue content, has improved to meet today`s consumer expectations and demands. At the same backfat thickness, i.e. 19.31 mm in both years, there was recorded increased loin eye height by ca 0.7 mm. That was reflected in the percentage of meat content in carcass, which was 51.45% in 2006 and appeared higher by 0.59% (significant differences) than in 2005. In 2006 the highest percentage of the evaluated carcasses was classified into the SEU classes, that is 64.23%, and it was more by 6.67% as compared to 2005 (Fig. 1).

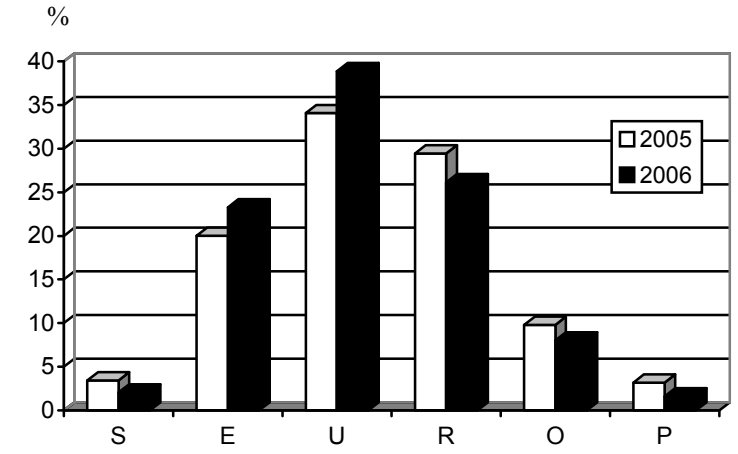

Fig. 1. Percentage of carcasses in EUROP classes
Rys. 1. Procentowy udział tusz w klasach EUROP

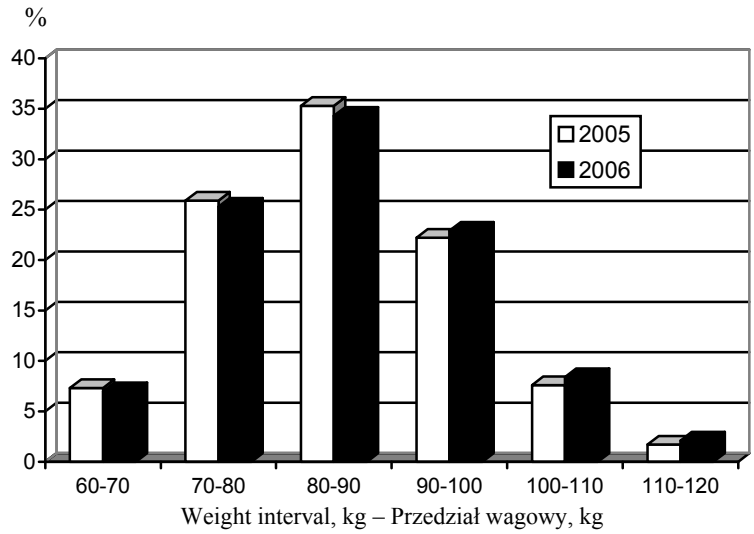

Fig. 2. Percentage of carcasses in weight intervals
Rys. 2. Procentowy udział tusz w przedziałach wagowych

The number of carcasses obtained in the quarters of the analyzed years was differentiated (Tabs. 2 and 3). In 2005, the lowest number of carcasses, i.e. 52 969 was recorded in the first quarter and the value was lower by 20 176 units as against the fourth quarter, when the largest number of carcasses evaluated was noted. However, in 2006 the situation looked different. The highest number of carcasses – 81 570 was obtained in the first quarter, while the lowest – 56 599 units in the third quarter.

Carcass mass in the successive quarters ranged between 82.73 kg (3rd quarter 2006) up to 87.70 kg (1st quarter 2006). Interestingly, backfat thickness in the quarters of the subsequent years appeared to be substantially differentiated and pronounced differences

were recorded in 2006. The average backfat thickness in the first quarter of this year reached 20.17 mm and was greater by 1.68 mm compared to that reported in the third quarter. This result was reflected in the meat content in the carcasses. Meatiness in the third quarter of 2006 was 51.99 % and proved higher by 1.17% as compared to the first quarter 2006.

Table 2. Characteristics of carcass quality obtained in successive quarters 2005
Tabela 2. Charakterystyka jakości tusz uzyskanych w kolejnych kwartałach 2005 r.

Quarter Kwartał	Number of carcasses Liczba tusz	Carcass mass, kg Masa tuszy, kg		Backfat thickness, mm Grubość słoniny, mm		Loin eye height, mm Wysokość „oka" polędwicy, mm		Carcass meatiness, % Mięsność tuszy, %	
		$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
I	52969	85.87	10.52	19.42	6.68	52.42	6.51	50.27	5.74
II	59135	85.37	10.56	19.38	5.89	52.43	6.60	50.49	5.90
III	56453	82.86	10.33	18.73	6.02	52.01	6.85	51.56	4.92
IV	73145	85.84	11.06	19.62	6.04	52.63	6.68	51.06	4.87

Table 3. Characteristics of carcass quality obtained in successive quarters 2006
Tabela 3. Charakterystyka jakości tusz uzyskanych w kolejnych kwartałach 2006 r.

Quarter Kwartał	Number of carcasses Liczba tusz	Carcass mass, kg Masa tuszy, kg		Backfat thickness, mm Grubość słoniny, mm		Loin eye height, mm Wysokość „oka" polędwicy, mm		Carcass meatiness, % Mięsność tuszy, %	
		$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
I	81570	87.70	11.22	20.17	6.38	52.89	6.55	50.82	5.04
II	71268	85.90	10.83	19.67	6.35	52.72	6.67	51.05	5.00
III	56599	82.73	10.38	18.49	5.88	52.87	6.98	51.99	4.73
IV	78443	84.63	10.74	18.69	5.68	53.61	6.74	52.08	4.56

Table 4. Characteristics of carcass quality in weight intervals in 2005
Tabela 4. Charakterystyka jakości tusz w przedziałach wagowych w 2005 r.

Weight interval, kg Przedział wagowy, kg	Carcass mass, kg Masa tuszy, kg		Backfat thickness, mm Grubość słoniny, mm		Loin eye height, mm Wysokość „oka" polędwicy, mm		Carcass meatiness, % Mięsność tuszy, %	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
60–70	66.47	2.55	15.82	4.75	48.39	6.97	52.65	4.65
70–80	75.52	2.80	17.48	5.10	50.58	6.61	51.98	4.87
80–90	84.81	2.86	19.26	5.59	53.04	6.41	51.07	5.23
90–100	94.20	2.80	21.06	5.98	53.98	6.27	49.79	5.54
100–110	10.78	2.73	22.92	6.43	53.77	6.26	48.28	5.69
110–120	113.53	2.72	24.70	6.99	52.77	6.37	46.84	5.84

Table 5. Characteristics of carcass quality in weight intervals in 2006
Tabela 5. Charakterystyka jakości tusz w przedziałach wagowych w 2006 r.

Weight interval, kg Przedział wagowy, kg	Carcass mass, kg Masa tuszy, kg		Backfat thickness, mm Grubość słoniny, mm		Loin eye height, mm Wysokość „oka" polędwicy, mm		Carcass meatiness, % Mięsność tuszy, %	
	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD	$\bar{x}$	SD
60–70	66.40	2.57	16.19	4.94	49.80	7.75	52.80	4.19
70–80	75.46	2.81	17.44	5.26	51.73	6.86	52.41	4.37
80–90	84.78	2.86	19.10	5.74	53.59	6.45	51.73	4.71
90–100	94.29	2.84	20.92	6.23	54.32	6.28	50.64	5.07
100–110	103.84	2.78	22.77	6.75	54.03	6.26	49.35	5.37
110–120	113.50	2.73	25.00	7.32	52.80	6.19	47.61	5.52

Analyzing the raw material arranged in the order with respect to carcass mass (Tabs. 4 and 5), it was found that carcass weight gain by 10 kg implicated an increase of fat tissue thickness by 1.3–2.2 mm. Besides, the obtained values showed correlations with the year when the carcasses were obtained. At he lowest carcass mass ranging between 60 and 70 kg, backfat thickness amounted to 15.82 mm in 2005, while in 2006 – 16.19 mm. The values appeared to be lower as compared to carcass weight in the 110–120 kg interval by 8.88 mm and 8.81 mm, respectively.

The data presented in Tables 4 and 5 show that increased carcass mass was concurrent with increased height of the longest dorsal muscle cross-section. The differences between carcass mass intervals 60–70 kg and 110–120 kg were found to be 4.38 mm in 2005 and 3.00 in 2006.

Meatiness of the carcasses under study declined with their mass rise. Carcass mass gain by 10 kg caused a decrease of carcass meatiness by ca 1%. With the carcass mass of 110–120 kg, meatiness amounted to only 46.84% in 2005, whereas 47.61% in 2006, which classified this raw material to class R.

The percentage of carcasses found in the extreme weight intervals, i.e. 60–70 kg and 110–120 kg regarding the whole slaughter material obtained, appeared to be only slight as it did not exceed 9% (Fig. 2). Generally, the obtained carcasses were in the range of 70–80 kg and 80-90 kg mass, 25 and 35% respectively, whereas compared to 2005 and 2006, the persistent fluctuations decreased to a low level, i.e. under 1%.

DISCUSSION

The carcass meatiness scores obtained in the meat plant are slightly lower compared to the mean national coefficient [Lisiak and Borzuta 2007]. However, it should be highlighted that the porkers under study came from the Lubelszczyzna region, which is known for the extensive farmland fragmentation and use of conventional feedstuffs produced at the farm for the nutrition of pigs. According to Koćwin-Podsiadła [1999] and Gajewczyk [1999], swine feeding strategy based on on-farm feeds constitutes a significant determinant of pork carcass quality.

Pork production in Poland continues to follow the distinct seasonal and cyclic patterns that have been characteristic of the supply for many years. The most important contributors prove to be the cyclical fluctuations related to the mechanism of so called pork cycle. An immediate reason for a "pork cycle" occurrence is instability of breeding profitability due to changes in prices of feeds and live animals for slaughter [Hamulczuk 2006, Kozera 2007]. This trend is reflected in the research results.

Slaughter value of porkers is also affected by pre slaughter mass. Wajda *et al*. [2004] and Stasiak *et al*. [2007] report that estimation of tissue composition of carcasses obtained from fatteners of various slaughter weight revealed that increased slaughter mass induces a rise in weight of the basic tissues, but their gain growth rate is not proportional. The increase in fat deposition rate concurrent with a higher body mass of fatteners results in a fat to meat ratio that becomes unfavorable in carcass.

CONCLUSIONS

1. In the years 2005–2006, the average carcass meatiness reached 51.15%.

2. Quality of carcasses obtained in the successive years was dependent on the quarter of the year. The thickest backfat (20.17 mm) was reported in the carcasses obtained in January, February, March 2006. On the other hand, the lowest meatiness – 52.08% was established for the slaughter material obtained in the fourth quarter of this year.

3. In both years under study, the highest content, ca 35%, was determined for the carcasses of 80–90 kg mass.

4. The increase in carcass mass caused a rise of backfat thickness. On average, a 10 kg-rise in body mass resulted in a 1.8 mm increase of backfat thickness. This correlation was reflected in the carcass meatiness score that ranged from 52.7% in the 60–70 kg weight interval up to ca 47.2 kg in a group of carcasses weighing 110–120 kg.

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Streszczenie. Analizą objęto tusze tuczników skupowanych na Lubelszczyźnie. Zgromadzone dane obejmowały lata 2005–2006. Jakość tusz oszacowano na podstawie pomiarów umięśnienia i otłuszczenia, wykonywanych aparatem ultradźwiękowym Ultra-Fom 300. Zebrany materiał uszeregowano w zależności od kwartału skupu i masy tuszy. W ocenianych latach średnia mięsność tusz wynosiła 51,15%. Jakość tusz, wyrażona grubością słoniny i wysokością „oka" polędwicy, pozyskiwanych w kolejnych latach wykazywała zmiany w zależności od kwartału danego roku. Najwięcej ocenianych tusz było w przedziale wagowym 80–90 kg.

Słowa kluczowe: tuczniki, wartość rzeźna, grubość słoniny, wysokość „oka" polędwicy