

Impact of the implementation of after-slaughter classification on the porcine carcass quality improvement In Poland

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Introduction

The introduction of after-slaughter pig classification according to the EUROP system has contributed to an increase in fatterer meatiness, and thus to an increase in the proportion of prime cuts in the carcass (Strzelecki 1997, Borzuta 1998). The recorded improvement in meatiness results, among other things, from the introduction to commercial production of fatteners of breeds and crosses characterized by high meatiness as well as hybrid pigs. Currently in the total population of fatteners the proportion of high-meatiness classes S, E, U is over 80% and only approx. 4.5% of carcasses come from high-fatness classes O and P (Lisiak et al. 2008). It was observed that the proportion of carcasses with quality defects such as PSE increased with an increase in meatiness and body weight of fatteners.

The aim of the study was to determine the effect of the applied instrumental classification of porcine carcasses on qualitative changes in the fatterer population in Poland.

Materials and methods

Meat content in the carcass up to the year 2003, was estimated using Ultra-Fom 100 choirometers and electronic rulers, and next with Ultra-Fom 300, CGM and IM-03. Some proportion of the material was analyzed in terms of its quality by measuring pH₄₅ in the *longissimus dorsi* muscle at the last rib with a Radiometer Portable pH-meter coupled with a dagger electrode. The share of individual quality groups was established using the following criteria: extreme PSE pH₄₅ up to 5.8, PSE pH₄₅ of 5.81 – 6.00; partial PSE pH₄₅ of 6.01 – 6.30 and normal meat pH₄₅ over 6.30. Results were analyzed statistically by calculating means and the structure of porcine carcasses.

Results and discussion

In 1995 fatterer carcasses of 81.8 kg were characterized by meatiness of 44.0% and their share in individual classes was 0% carcasses in class S, 2.1% in class E, 8.4% in class U, 24.5% in class R, 46.6% in class O and 18.4% in class P, respectively (Table 1).

Table 1. Results of slaughter value evaluation of fatteners slaughtered in Poland from 1995 to 2007 year

Year	Hot carcass weight, kg	Meatiness, %	Structure of carcass classes, %					
			S	E	U	R	O	P
1995	81.8	44.0	-	2.1	8.4	24.5	46.6	18.4
1996	81.4	45.0	-	3.0	9.2	25.5	47.2	15.1
1997	81.0	46.7	-	7.8	20.1	30.8	30.7	10.6
1998	80.5	47.6	-	10.6	23.3	31.1	27.0	8.0
1999	79.4	49.0	-	14.5	28.5	31.3	20.3	5.4
2000	79.7	50.3	-	20.6	32.2	28.2	15.3	3.7
2001	81.7	50.4	-	21.1	32.0	29.3	14.9	2.6
2002	83.4	50.2	-	20.9	31.9	29.5	15.0	2.6
2003	82.3	50.9	-	25.4	32.4	26.6	12.1	3.41
2004	82.7	52.0	2.3	29.0	35.6	22.7	8.5	1.9
2005	85.1	52.7	4.3	33.5	35.1	18.7	6.8	1.6
2006	85.5	53.1	4.4	35.2	36.4	17.2	5.5	1.3
2007	85.0	53.8	5.9	39.4	36.1	14.0	3.7	0.9

The increase in meatiness to 45.0%, 46.7%, 47.6%, 49.0% reported in the successive years and 50.3% in 2000, apart from the genetic and breeding progress, resulted also from the partial decrease in carcass weight from 81.4 kg in 1996 to 79.4 kg in 1999 and 79.7 kg in 2000. In that time a highly positive increase was found for the proportion of carcasses in class E, amounting to 2.1% in 1995 up to 20.6% in 2000, at the considerably decreasing percentage of the fattest carcasses classified to class P, from 18.4% to 3.7% in 2000

(Lisiak and Borzuta 2002). Starting from 2000 a gradual increase in carcass weight has been recorded, i.e. 79.7 kg, respectively; in 2001 it was 81.7 kg, 83.4 kg in 2002, 82.3 kg in 2003, 82.7 kg in 2004, 85.1 kg in 2005 and up to 85.5 kg in 2006. In 2007 the mean carcass weight decreased slightly by 0.5 kg. In 2005, at carcass weight of 85.1 kg and meatiness of 52.7% the share of carcasses in individual classes was 4.3% in class S, 33.5% in class E, 35.1% in class U, 18.7% in class R, 6.8% in class O and 1.6% in class P, respectively (Lisiak et al. 2005, Strzelecki et al. 2005). Results of studies for 2006 indicate that at carcass weight of 85.5 kg and meatiness of 53.1% the proportion of carcasses in the best quality classes S, E and U increased by 3.1% and it decreased by 1.6% in the worst classes O and P. In turn, results from 2007 indicate that at the mean carcass weight reduced by 0.5 kg their meatiness increased by 0.7%, amounting to 53.8%, while the share of carcasses in individual classes was 5.9% in w class S, 39.4% in class E, 36.1% in class U, 14.0% in class R, 3.7% in class O and 0.9% in class P (Lisiak et al. 2008).

For more than a decade porcine carcasses have exhibited a high percentage of quality defects such as PSE, as it is manifested in the data collected from studies on the population of pigs slaughtered in Polish abattoirs: 1990 – 7.0% carcasses, 1993 – 14.0% carcasses, 1995 – 15.0% carcasses, 1999 – 10.0% carcasses and 2002 – 13.9% carcasses with extreme PSE ($\text{pH}_{45} \leq 5.8$) (Borzuta et al. 2003). When comparing the results of studies from 2005 with those collected in 2002 we may observe a significant reduction in the number of carcasses with meat defects such as PSE (Table 2). In the summer season of 2005 the share of carcasses with extreme PSE (8.8%) was much higher than in meat from animals slaughtered in the winter season (4.2%). Results of studies from 2007 indicate a further reduction of the incidence of meat defects of the PSE type in carcasses from the marketable population. In the winter season of 2006/07 the mean number of carcasses with $\text{pH}_{45} \leq 5.80$ was 3.7%, ranging from 0.8% to 5.7%, and it was by 0.5% lower than in the evaluated period of 2004/05. In the summer season of 2007 the share of carcasses with extreme PSE was two times higher, amounting to 7.1% at larger deviations ranging from 1.8% to 10.7%.

Table 2. Results of meat quality evaluation of fatteners from mass population

Specification	Share of carcasses with different quality, %			
	Extremely PSE $\text{pH}_{45} \leq 5.8$	PSE $\text{pH}_{45} 5.81$ – 6.00	Partly PSE pH_{45} 6.01 - 6.30	Normal $\text{pH}_{45} > 6.3$
2002 summer	13.9	13.2	32.9	40.0
min - max	4.3 – 24.1	3.7 – 23.0	24.3 – 39.5	19.9 – 67.7
2005 winter	4.2	7.2	27.2	61.0
min - max	1.7 – 7.6	2.8 – 13.9	16.6 – 41.4	37.0 – 78.6
2005 summer	8.8	12.2	35.6	43.4
min - max	3.6 – 14.8	7.8 – 17.7	29.2 – 40.1	29.9 – 59.3
2007 winter	3.7	5.2	23.6	61.0
min - max	0.8 – 5.7	2.3 – 7.3	19.0 – 27.1	60.7 – 75.6
2007 summer	7.1	11.7	33.4	47.8
min - max	1.8 – 10.7	4.4 – 19.7	19.6 – 44.0	21.8 – 74.2

Conclusions

As a result of the introduction in Poland of the after-slaughter carcass classification according to the EUROP system and the intensification of breeding efforts in recent years a significant increase has been recorded in carcass meatiness in pigs from the marketable population. With an increase in meatiness and carcass weight the share of carcasses from superior classes was found to increase (class S has been monitored since 2004) and in 2007 as many as 81.4% carcasses have been classified to the most valuable classes S, E and U (including 5.9% in class S) for the tested fatteners and only 4.6% were graded as classes O and P with a large proportion of fat in the carcass. In the analyzed period considerable progress has been observed in terms of the elimination of the PSE meat quality defect. From approx. 15% carcasses with extreme PSE in 1995 this proportion last year decreased to 5.4%, while in the summer season it is still almost two times higher, amounting to 7.1% in relation to 3.7% in the winter period.

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