

MEAT QUALITY OF INDIGENOUS PRESTICE BLACK-PIED PIG AND COMMERCIAL HYBRID PIGS

Nevrkla P.¹, Václavková E.²

¹ Mendel University in Brno, Department of Animal Breeding, Faculty of AgriSciences, Czech Republic

² Institute of Animal Science Prague, Department of Pig Breeding, Czech Republic

Abstract

The aim of this study was to compare carcass traits and quality of meat in different genotypes of pigs. A total of 80 animals were included in the experiment, 20 pigs of native breed Prestice Black-Pied breed (PBP), 30 of hybrid combination (Large White x Landrace) x (Duroc x Pietrain) pigs (DPN) and 30 of hybrid combination (Large White x Landrace) x (Large White sire line x Pietrain) boars (LWPN). PBP pigs showed higher values of IMF ($P \leq 0.01$) and BF ($P \leq 0.01$), lower lean meat content and drip loss value ($P \leq 0.001$) than the DPN and LWPN hybrids. The value of pH_{45,24} was higher ($P \leq 0.05$; $P \leq 0.01$) in PBP pigs.

Key Words: Pig, Prestice Black-Pied breed, hybrid, meat quality

The intensive pork industry is based on the use of several basic breeds. To maximize the performance of animals for fattening, hybrid breeding programmes are established in countries with intensive pig production. Breeders' goal is to achieve maximum reproductive performance and high daily gains in fattening pigs. On the other hand, interest in native breeds has increased in recent years. Consumers require tasty and healthy products of local origin. Scientific research (Kasprzyk et al., 2015; Matoušek et al., 2016) indicates that indigenous breeds of pigs are characterized by certain differences in meat quality when compared to hybrid pigs, particularly higher juiciness and better texture associated to higher fat cover of the pigs. Modern breeds (Duroc, Pietrain, Large White) and their hybrids reach higher growth intensity and higher lean meat content in carcass than traditional pig breeds. Szulc et al. (2012) states that breed also affect intramuscular fat content, which is higher in traditional pigs than in hybrids. They documented these findings in Złotnicka Spotted vs. Złotnicka Spotted × Duroc. The higher intramuscular fat content is a typical parameter of local pig breeds. The high content of intramuscular fat was found in Nero Siciliano and Cinta Senese breeds (Pugliese et al., 2004; Franci et al., 2005; Sirtori et al., 2011). Meat of native breeds also shows more favourable pH value and drip loss value than commercially used pig genotypes (Grześkowiak et al., 2009; Kasprzyk et al., 2015).

Prestice Black-Pied pig is Czech national breed, which comes from the western region of the Czech Republic. In 1992 the breed was included in the genetic resources and belongs to the National program of genetic resources. The breed is characterised by good reproductive qualities. The animals have medium body frame and very solid constitution. Their colour is black and white without definition of black or white body parts (Matoušek et al., 2016). The importance of this breed lies in its adaptability, good vitality and resistance to diseases. The breed is characterised by higher backfat thickness and very good meat quality (Lustykova et al., 2008).

Material and Methods

The objective of this study was to compare growth performance and selected carcass traits in a native Czech breed Prestice Black-Pied pig (PBP) and in two commercial hybrid pigs used for meat production. A total 80 animals were included in the experiment, 20 pigs of native breed PBP, 30 animals of hybrid combination (Large White x Landrace) x (Duroc x Pietrain) (DPN) and 3 animals of (Large White x Landrace) x (Large White sire line x Pietrain) (LWPN) combination. Number of males and females were balanced in the groups. The water and feed intake was *ad libitum*. Animals were fed with commercial feed mixtures for fattening pigs. The feed mixture contains 89.6 % of dry matter, 162.2 g/kg of crude protein, 24.98 g/kg of

fat, 37.69 g/kg of crude fibre, 9.16 g of lysine, 12.88 MJ of metabolised energy. Average slaughter weight was 113.26 ± 5.39 kg for PBP pigs (at the age of 210 days), 115.96 ± 8.19 kg for DPN pigs (at the age of 179 days) and 116.98 ± 3.49 kg for LWPN pigs (at the age of 183 days). After termination of fattening, the pigs were slaughtered at the experimental slaughterhouse. Carcasses were classified by the ZP method of the SEURO system (EU decision 2005/1/ES). Measurement of the meat quality was performed on the left side of each carcass. At the time of 24 hours after the slaughter, samples of *Musculus longissimus lumborum et thoracis* were collected from the region between the second and the third last rib and transported to the laboratory. Estimation of the drip loss was performed during the period of 24–48 h after slaughter, by weighing 150 g of meat hanging in a bag at 5°C. The content of intramuscular fat was determined according to CSN ISO1444 (1997) by extraction in a Soxtec 1043 apparatus (FOSS Tecator AB, Hoganas, Sweden). Muscle pH was measured using a portable pH meter (pH 340i) equipped with a glass electrode at 45 min and 24 h post-mortem in fresh samples. The data were analysed using software QC expert (TriloByte Statistical Software Ltd.). All data were expressed as mean \pm standard deviation. Student's t-test was used for analysis of the data. The differences among means in the t-test were considered significant only if the F-test was significant.

Results and Discussion

Table 1 shows selected parameters of carcass traits and meat quality. The findings indicate that local PBP pigs have significantly lower average daily gain compared to hybrid pigs ($P \leq 0.01$). Dostálová et al. (2012) reported average daily gain of 650 g at slaughter weight of 92 kg (186 days). Matoušek et al. (2016) observed lifetime daily gain of 622 g in PBP pigs slaughtered with weight 106 kg. Maiorano et al. (2013) compared growth intensity of Caseranta breed, Duroc x Landrace x Large White hybrid and Large White breed. They found the lowest growth intensity in Caseranta breed (478 g), the highest daily gain (739 g) was in Large White pigs. Also Robina et al. (2013) found lower daily gain in local Iberian breed in comparison with the Duroc breed in different age. Between days 76-177 it was 390 g in the Iberian pigs and 528 g in the Duroc.

In traditional breeds the values of backfat thickness (BF) are in general much higher than those obtained from modern breeds that are selected for leaner carcasses. The results in Table 1 show that PBP pigs have significantly higher ($P \leq 0.01$) backfat thickness and intramuscular fat (IMF) content ($P \leq 0.01$) than hybrid pigs. The findings documented in Table 1 also indicate that pigs of PBP breed had lower content of lean meat than hybrid pigs ($P \leq 0.01$).

Similar trend in native breeds was documented in most studies (Zhang et al., 2009; Yu et al., 2013). Lower average BF thickness was recorded in Zlotnicka Spotted breed by Kapelanski et al. (2006). Szulc et al. (2012) found out that pigs of Zlotnicka Spotted breed (202 days old, 119.20 kg) showed significantly higher BF thickness and lower lean meat content than hybrids of Zlotnicka Spotted \times Duroc (185 days old, 114.10 kg) (34.96 vs. 29.67 mm and 41.83 vs. 45.89%). According Alfonso et al. (2005), Basque Black-Pied pigs (slaughter weight 86.2 kg) had higher BF thickness (26 mm) and IMF content (3.22%) compared to hybrid (Large White \times Landrace) pigs (slaughtered with 126.6 kg), with BF thickness 20 mm and IMF content 1.77%. Higher content of IMF is a typical parameter in native pig breeds. The breed Nero Siciliano achieved 3.3 % of IMF in slaughter weight 102 kg (Pugliese et al., 2004), similiary Cinta Senese breed slaughtered in 136 kg had 3.2 % of IMF (Franci et al., 2005) and 6 % of IMF in 154 kg of slaughter weight (Sirtori et al., 2011).

The results of our study document that PBP pigs reach better results in drip loss value and more favourable pH value against LWPN and DPN pigs, which indicates that meat of native breeds could be characterized by slower pH decrease post-mortem. Similar findings were described by Kasprzyk et al. (2015) in Puławska breed when compared to Landrace. The authors reported the following results: drip loss value 3.71% vs. 4.85%, pH_{45} 6.15 vs. 5.77 and pH_{24} 5.59 vs. 5.45. In Krškopolje breed Candek-Potokar et al. (2003) reported the relatively low pH_1 value of 5.84. According Alfonso et al. (2005), the meat of pigs of Basque Black-Pied breed had higher pH_{24} than the meat of Large White breed. On the contrary, Franci et al. (2005) found no differences between Cinta Senese and Large White pigs.

Table 1. Parameters of carcass traits and meat quality in Prestice Blac-Pied and hybrid pigs

	PBP	LWPN	DPN
Average daily gain (g)	539.31 ± 20.40 AB	639.25 ± 11.907 A	647.80 ± 10.12 B
Backfat thickness (mm)	24.52 ± 5.71 AB	18,05 ± 4.36 A	16.03 ± 3.40 B
Lean meat content (%)	51.26 ± 0.64AB	56.47 ± 0.69 A	57.30 ± 3.24B
Intramuscular fat (%)	2.89 ± 0.13 AB	2.08 ± 0.08 A	1.92 ± 0.39 B
Drip loss (%)	2.61 ± 0.16 AB	3.76 ± 0.10 Aa	4.74 ± 0.80 Ba
pH ₄₅	6.14 ± 0.12 aB	6.04 ± 0.10 a	5.92 ± 0.16 B
pH ₂₄	5.65 ± 0.03 AB	5.47 ± 0.13 A	5.23 ± 0.28 B

a, b – values in rows with the same letters differ significantly ($P \leq 0.05$)

A, B, C – as above for ($P \leq 0.01$)

Conclusion

The experiment demonstrated that meat of Prestice Black-Pied breed significantly differs from meat of commercial hybrid pigs. It has significantly higher content of intramuscular fat, higher backfat thickness and consequently lower lean meat content. The meat of Prestice Black-Pied pigs is characterized by better qualitative parameters, namely lower drip loss value and slower pH decrease post-mortem, than the commercial hybrid pigs.

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Corresponding Address:

Ing. Pavel Nevrkla, Ph.D.
Mendel University in Brno
Department of Animal Breeding,
Faculty of AgriSciences,
Zemědělská 1, 61300 Brno, Czech Republic
E-mail: NevrklaPavel@seznam.cz

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