

# EFFECT OF SELECTED PIGS GENOTYPES ON THE TEXTURE OF MEAT PRODUCTS

Eugenia Grześkowiak, Dariusz Lisiak, Andrzej Borys, Karol Borzuta, Jerzy Strzelecki  
*Meat and Fat Research Institute in Warsaw, Poland*

## Introduction

The most important genetic factor influencing the nutritive and technological quality of pork is the breed or the crossing model from which the given fattener derives. It seems particularly interesting to determine the impact of unfavourable meat qualities of various genotypes of commercial fatteners on the technological yield of various products in the course of their processing as well as their interrelations with quality, especially with the texture of final products.

The investigations carried out so far appear to indicate that the reduced processing yield of meat is connected with a poor water holding capacity and a fairly considerable variations in the level of free drip from the meat tissue of fatteners derived from various genotypes [Joo et al., 1997; Krzęcio et al., 2004].

The aim of the presented investigations was to verify in practice technological yield of products manufactured from the meat of fatteners derived from different mating models and to determine their rheological and sensory traits.

## Material and methods

The investigations comprised six groups of fatteners differing with respect to their genetic type and kept in identical environmental and nutritional conditions on a farm in the region of Wielkopolska. The experimental material included loin muscles (30 samples) cut out from chilled pigs half-carcasses of the following hybrids: control group – purebred fatteners of Polish Large White PLW x PLW (K); experimental groups: sows of Polish Large White x Polish Landrace (PLW x PL) breeds mated with boars of Duroc (D), Hampshire (H), Hampshire x Duroc (HD), Pietrain (P) and Pietrain x Hampshire (PH) breeds.

Smoked raw loin was manufactured from the thoracic part of the LD muscle, from the section between the 6<sup>th</sup> and 11<sup>th</sup> vertebra. Lean muscles were cured in brine with the following composition: NaCl – 6%, sodium nitrite – 0.055%, sugar – 1.1%, sodium ascorbate – 0.04%, water – 92.805%.

In order to characterise technological efficiency and quality of the final product, the authors:

- Carried out sensory evaluation of the manufactured meat articles by determining: the juiciness, tenderness and palatability. The assessment was conducted by a trained, 5-person panel of judges using a 5 point scale.
- Established texture parameters of the obtained meat products using, for this purpose, an Instron 1140 apparatus [Chrystall et al., 1994],
- Calculated (in %) the yield of the final product in relation to the fresh raw material.

## Results and discussion

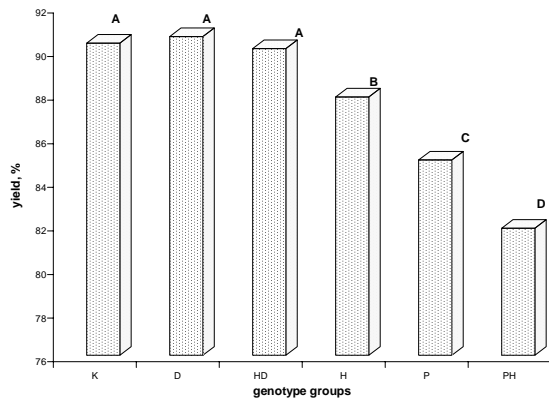
It was found that the meat of fatteners upgraded with Hampshire and Pietrain breeds was characterized by about 2.5% to 8.5% significantly lower yield of the smoked raw loin in comparison with the meat from the remaining groups (groups K, D and HD – Figure 1). Similarly low indices of technological low for pigs which were carriers of the RN<sup>-</sup> gene (from about 85.4 to about 89.0%) during the process of curing and cooking were reported by other researchers who employed the “Napole” method in their experiments (Neveau et al., 1985; Monin and Sellier 1985). The authors claim that the reduced technological yield as well as undesirable quality traits of this meat was the consequence of the presence of the RN<sup>-</sup> gene in the population of the Hampshire breed as well as in the crossbreds upgraded by this breed.

In comparison with groups P and PH (3.93 and 3.80 points), smoked loin manufactured from the meat of fatteners upgraded with Duroc boars and control group was characterised by more favourable tenderness (4.44 and 4.69 points- Figure 3). The above data were confirmed by penetrometric and texture measurements of tenderness (Figure 2). A significantly greater toughness estimated penetrometrically was determined in the loin derived from the meat of crossbreds upgraded with the Pietrain and Hampshire breed boars in relation to the remaining groups. Similar relationship was noted in shear force measurements.

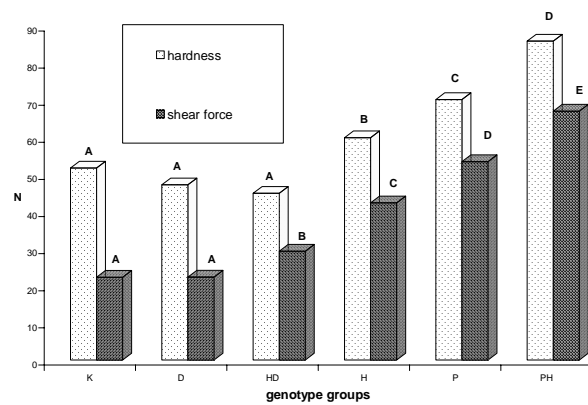
## Conclusions

More advantageous technological yield in the production of smoked raw loin was observed in the case of the meat of the fatteners from the control group and from groups upgraded with the Duroc breed in comparison with the fatteners which were upgraded with the Hampshire and Pietrain boars. The difference in yield ranged from 2.5 to 8.5%. From the point of view of sensory evaluation smoked loin obtained from the muscles of control fatteners were clearly more attractive. Products manufactured from the muscles of crossbreds

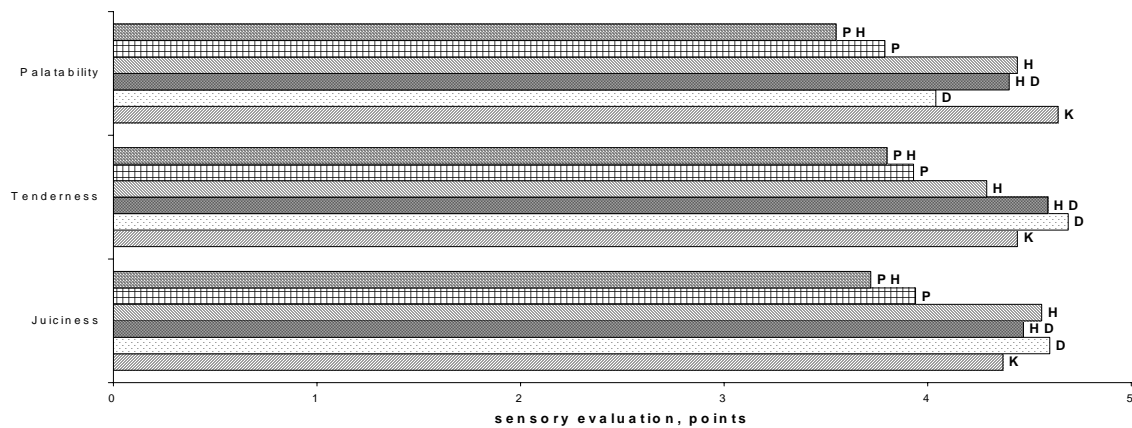
upgraded with the Pietrain and Hampshire breeds were assessed significantly lower. Better tenderness to smoked loins derived from fatteners upgraded with the Duroc breed in comparison with the Pietrain breed.



**Figure 1.** Technological yield of smoked loin prepared from meat of different pigs genotype (A,B,C,D – significant at  $p < 0,01$ )



**Figure 2.** Texture of smoked loin prepared from meat of different pigs genotype (A,B,C,D,E – significant at  $p < 0,01$ )



**Figure 3.** Results of sensory evaluation of smoked loin prepared from meat of different pigs genotype

## References

1. Chrystall B.B., Culioli J., Demeyer D., Honikel K.O., Moller A.J., Purslow P., Schwägle F., Shorthose R., Uytterhaegen L., 1994. Recommendation of reference methods for assessment of meat tenderness, 40 th ICoMST, The Hague.
2. Joo S.T., Kim B.Ch. 1997. Effects of backfat thickness and intramuscular fat % on color and drip loss of pork loin. 43 rd ICoMST, New Zeland, G1-10: 568-569
3. Krzęcio E., Koćwin-Podsiadła M., Zybert A., Sieczkowski H., Antosik K., Mischczuk B., Włodawiech P. 2004. The characteristic of carcass and meat quality of fatteners differentiated by drip loss from *longissimus lumborum* muscle tissue. *Zeszyty Naukowe Przeglądu Hodowlanego* 72, 2: 143-152.
4. Monin G., Sellier P. 1985. Pork of low technological quality with a normal rate of muscle pH fall in the immediate post-mortem period. The case of the hamshire breed, *Meat Sci.* 13: 49-63
5. Naveau J., Pommeret P., Lechaux P. 1985. Proposition d'une methode de mesure du rendement technologique: la „methode Napole”, *Techni-Porc.* 8: 7-13.

