## Genotype differences in initial pH of the ham in a Belgian slaughterhouse

Eline Kowalski[1], Els Vossen[2], Sam Millet[3], Marijke Aluwé[3], Stefaan De Smet[2]

[1] Ghent University, Laboratory of Animal Nutrition and Animal Product Quality and Flanders Research Institute for Agriculture, Fisheries, and Food (ILVO), Ghent, Belgium
[2] Ghent University, Laboratory of Animal Nutrition and Animal Product Quality, Ghent, Belgium
[3] Flanders Research Institute for Agriculture, Fisheries, and Food (ILVO), Melle, Belgium

**Introduction:** The rate of post-mortem muscle glycolysis has an important influence on the quality of pork (Prevolnik Povse et al. 2015). A rapid pH decline in combination with a high carcass temperature leads to a paler appearance and lower water-holding capacity. The positive relationship between the pH values early post mortem and inferior meat quality indicates that initial pH (pHi) measurements in the m. semimembranosus are a good proximate for assessing ham quality (Hugenschmidt et al., 2010). Although mechanisms behind post-mortem muscle pH decline have been widely investigated, only limited information on the current pHi distribution in ham of contemporary pigs is available (Clinquart et al., 2019). We therefore performed an observational study to investigate the variation in pHi in ham of diverse genotypes.

**Materials and methods:** This study was performed on five days during February and March 2020 in one slaughterhouse. A total of 88 batches were followed, originating from 76 farms. The pHi was assessed 35 min. after slaughter by measuring in the m. semimembranosus of 13,707 carcasses. From all pigs, sex, slaughter day, and genotype (i.e. RYR1 mutation for stress sensitivity, dam line, and sire line) were recorded.After data cleanup of the raw data, a sub-dataset (n = 10,931) was made to analyse the effect of genotype per sex on lean meat content and pHi. In this dataset, only gilts (G) and barrows (B) were included as the presence of immunocastrates or entire males was scarce. Five known genotypes (dam line × sire line; stress sensitivity genotype: heterozygous, Nn and homozygous stress negative, NN) were included: DanBred Hybrid × Belgian Piétrain (DanBred × BP, Nn), Topigs20 × BP (Nn), DanBred Hybrid × Canadian Duroc (DanBred × CD, NN), DanBred Hybrid × PIC408 (DanBred × PIC, NN), PIC Camborough × PIC408 (PIC × PIC, NN). For the statistical analysis, a linear mixed model was used with farm as experimental unit, pHi and lean meat content as dependent variable, genotype as fixed factor, and farm and slaughter day as random factors. The model was analysed per sex as not all genotypes were recorded for each sex. Farm was included to account for the animals measured within one farm.

**Results:** A significantly lower lean meat content ($P < 0.001$) was observed for both G and B in the DanBred × CD (NN) genotype (G: 61.7, B: 59.1) compared to the other genotypes (Danbred × BP (Nn) (G: 65.1, B: 62.0), Topigs20 × BP (Nn) (G: 64.6,B:62.3), Danbred × PIC (NN) (G:64.5), PIC × PIC (NN) (G: 64.0), unknown (G: 64.7, B: 61.6)). For G, a significantly higher pHi ($P < 0.05$) was found for DanBred × CD (NN) offspring (6.79) compared to DanBred × BP (Nn) (6.62) with the other genotypes having intermediary values (Topigs20 × BP (Nn) (6.62), DanBred × PIC (NN) (6.72), PIC × PIC (NN) (6.68), unknown (6.63)). For B, a significantly higher pHi ($P < 0.001$) was observed for DanBred × CD (NN) offspring (6.80) compared to the other genotypes (DanBred × BP (Nn) (6.62), Topigs20 × BP (Nn) (6.65), unknown (6.60)).

**Conclusions:** In this study, the pHi in the ham was clearly affected by genotype. The use of Duroc sire line and homozygous stress negative sensitivity status were positively related to the pHi in the ham.

**Acknowledgements and Financial support statement:** This study was financially supported by the Agency for Innovation by Science and Technology (Research Foundation Flanders (FWO Vlaanderen), 150909).

**Literature:**

Clinquart, A., N. Korsak, N. Harmegnies, R. Vanleyssen, F. Farnir, M. Aluwé, A. Vautier, and S. Renard. 2019. "'Destructured Meat' Defect in Ham: Association with Carcass and Meat Quality Traits." In Bamst Symposium, Meet the Belgian Meat Researchers, 5–6.

Hugenschmidt, Gabriel, Ruedi Hadorn, Martin R.L. Scheeder, Paolo Silacci, Daniel Scherrer, and Caspar Wenk. 2010. "The Effects of Early Post-Mortem PH and Ultimate PH on Level and Amount of Destructured Zones in Cooked Cured Hams." Meat Science 85 (4): 632–39.

Prevolnik Povse, M., M. Candek-Potokar, M. Gispert, and B. Lebret. 2015. "Chapter 3: PH Value and Water-Holding Capacity." In A Handbook of Reference Methods for Meat Quality Assessment, 22–33.