

EXHAUSTED HOOLIGANS – SKIN LESIONS AS FIGHT MARKERS AND ULTIMATE PH IN THE NECK OF SLAUGHTER PIGS

Madeleine Dupuy¹ and Martin R. L. Scheeder^{2*}

¹Ecole Supérieure d'Agricultures, Angers, France

²SUISAG, Sempach, Switzerland

*Corresponding author email: msc@suisag.ch

I. INTRODUCTION

The dark appearance and compromised microbial stability of meat in the DFD (dark, firm, dry) condition, i.e. showing high ultimate pH, is undesired, particularly in cuts which are preferably commercialised as fresh meat [1]. When the slaughter plant, where also the pigs of the stationary performance test of the Swiss breeding program are processed, complained about a high incidence of DFD in the neck muscles of pigs, a survey was conducted. Recordings of the ultimate pH in the neck over 15 consecutive slaughter days at 12639 pigs from 170 producers and delivered by 19 suppliers revealed a mean incidence of 11.9 % DFD (ultimate pH > 6.2) with a high variation between slaughter batches from 0 up to 52 %. The mean incidence between suppliers varied between 6.8 and 26.7 % with the performance testing animals of Suisag ranking among the highest. These observations induced a more detailed and extended study of ultimate pH and its relation to lairage time and skin lesions in the performance testing pigs.

II. MATERIALS AND METHODS

The study was conducted with 2692 pigs fattened at the pig performance testing station of Suisag to a target carcass weight of 86 kg and slaughtered at a nearby (12 km) abattoir after CO₂-stunning. During the time between September 2020 and July 2021 ultimate pH (24 h p.m.) in the neck (*m. semispinalis capitis*, SP) was measured additionally to the routine pH measurements taken in the *m. long. thoracis* (LT) and the *m. semimembranosus* (SM) at 90 min. and 24 h p.m. using a pH-Star device (Matthäus, Eckelsheim, Germany). Starting from February 2021 pictures were taken from the left carcass sides of 1558 of the pigs and skin lesions were rated on a 4-point scale (1 – no lesions to 4 – severe lesions) at the four sites: neck and shoulder, breast (front middle), flank (hind middle), and hind leg. During February and March, covering eight slaughter days with a total of 559 animals, the pigs were stunned and slaughtered without lairage time (Batch 0). Before (Batch -1) and after that period (Batch 1), all pigs had a lairage time of around two hours between transport and stunning. The influence of lairage time and skin lesions on ultimate pH was statistically analysed using RStudio Software, applying one-way and two-way ANOVA.

III. RESULTS AND DISCUSSION

The ultimate pH differed significantly between muscles ($P < 0.001$), with SP generally showing the highest values (Fig. 1). At the same time SP was the only muscle showing an effect of lairage time on ultimate pH with significantly lower values ($P < 0.001$) and appreciably lower incidence of DFD when the

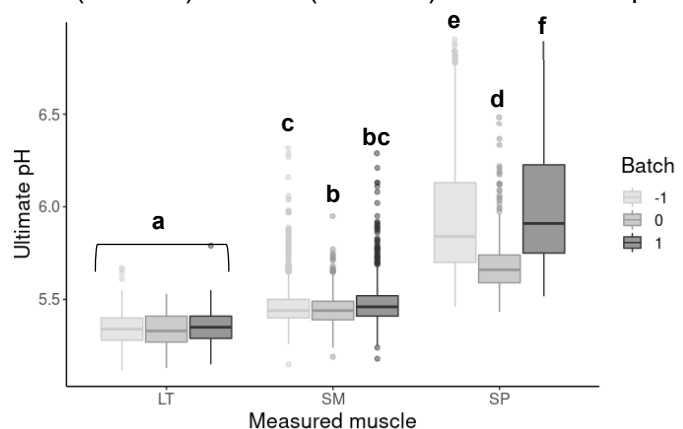


Figure 1. Ultimate pH in *m. long. thoracis* (LT), *semimembranosus* (SM) and *semispinalis capitis* (SP) after a lairage time of 2 h (batches -1 and 1) or no lairage (batch 0) before stunning. Groups lacking a common letter differ significantly ($P < 0.05$).

animals had no lairage time before stunning (Fig.1). Concurrently, a clear effect of lairage time on skin lesions at shoulder and neck was observed. Animals with clear and severe skin lesions (score 3 and 4) had significantly higher ultimate pH in the SP ($P < 0.001$, Fig. 2), indicating that the energy stores in this muscle must have been depleted during the fighting action the affected animals were involved in. This was the case in about one third of all animals receiving a regular lairage time of about two hours. When no lairage time was allowed, more than 95 % of the animals showed no or only slight skin lesions and only 0.4 % exerted an ultimate pH above 6.0. Without lairage time, obviously even aggressive animals hardly had time for fighting actions.

Under the conditions of the performance test, when animals are assigned for slaughter strictly according to their weight, it is inevitable to mix unfamiliar pigs from different pens for the transport. Thus, any established rank order is destroyed, and fights are triggered. Omitting a lairage period may overcome this problem, probably because the animals are sufficiently occupied by coping with the new and challenging situation of the uncommon environment and transportation. However, this kind of stress obviously leads to a more rapid drop of the early post-mortem pH in the LT ($P < 0.001$, Fig. 3). Stunning pigs without a recreation period after the transport led to a significantly lower pH 90 min p.m. in the LT, increasing the risk of PSE in the loin while preventing DFD in the neck. Interestingly, early post-mortem pH in the SM was not affected by lairage time.

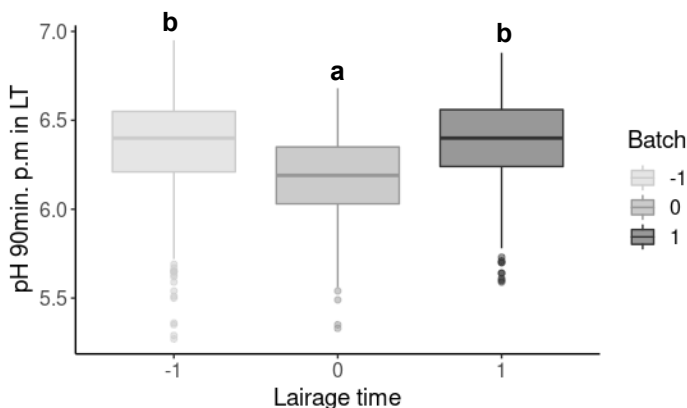


Figure 3. pH 90min. p.m. in *m. long. thoracis* after a lairage time of 2 h (batches -1 and 1) or no lairage (batch 0) before stunning. Groups lacking a common letter differ significantly ($P < 0.05$).

IV. CONCLUSION

To prevent a high incidence of DFD in the neck, every measure to prevent fighting actions may be helpful. Clear differences between slaughter batches of different suppliers indicate that some suppliers are more successfully realizing such measures. To refrain from allowing a (not necessarily recreational) lairage time could be effective but is not recommended, because of undesired effects on early post-mortem pH in the loin. It seems interesting to analyse the potential of ultimate pH in the neck and skin lesions as phenotypic traits to select for less aggressive animals. However, random effects of the variable conditions at different slaughter days, including the presence or absence of aggressive animals in the respective groups will probably challenge any effort to elucidate a genetic background of these traits.

REFERENCES

1. Warriss, P. D. (1999). Meat Science. Oxon: CABI Publishing

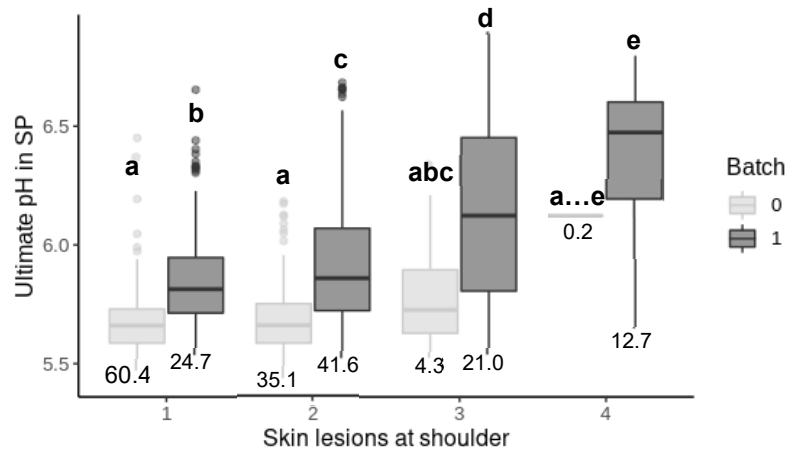


Figure 2. Ultimate pH in *m. semispinalis capitis* and skin lesions at shoulder (1- no, 4-severe) after a lairage time of 2 h (batch 1) or no lairage (batch 0) before stunning. Groups lacking a common letter differ significantly ($P < 0.05$). Numbers give the proportion [%] of pigs with the respective skin lesion scores.