INFLUENCE OF MUSCLE POSITION ON THE QUALITY OF VACUUM-PACKED BEEF

Alejandro Poveda[1*], Alexander Bobe[1], Johannes Krell [2], Monika Gibis [2], Volker Heinz [1], Nino Terjung [1], Igor Tomasevic [1]

[1]DIL German Institute of Food Technologies

[2] Department of Food Material Science, University of Hohenheim

*Corresponding author email: n.poveda@dil-ev.de

I. INTRODUCTION

A recent problem has been observed in the production of vacuum-packaged beef, which might develop a green-grey discoloration seven days after manufacture that differs notably from its regular purple-red colour. The meat industry has identified this quality defect has been by the meat industry, but a logical explanation is still missing. These discoloration difficulties occasionally appear during the year and have no regular fluctuations. The closest explanation for this phenomenon could be a change in the physico-chemical state of myoglobin, which directly affects the meat colour and the customer's acceptance of certain meat cuts [1]. It has been proposed that a concatenating of different intrinsic and extrinsic factors might result in detrimental meat colour of particular cuts, especially those used for locomotion of the animals, which have higher mitochondrial counts and myoglobin amounts [2].

II. MATERIALS AND METHODS

Muscles from the left side of 80 animals were collected during the summer months (May-October). Meat pieces were subjected to pH and temperature measurement at different times post-mortem (0, 3, 5, 24 and 48 hours) and instrumental colour measurement was carried out at 48 hours post-mortem. Samples were then vacuum-packaged and matured for the next seven days at two °C to check for any possible colour changes. After maturation, muscles were frozen for another three weeks and thawed. Then, meat was minced, and meat patties were formed and cooked at 72°C (the temperature at the centre) for further sensorial (smell, taste, and hardness) and WBSF analyses. Results were evaluated and compared using descriptive statistics.

III. RESULTS AND DISCUSSION

All cattle used in the trials were males, 92% of the animals belonged to the Simmental race or to a meat/milk mixture, 71% ranged between 18 and 22 months, and 86% weighted between 400 and 500 kg. A steeper pH decline could be seen in the silverside, compared to the shoulder clod (Fig.1).

From a total of 80 animals, seven shoulder clod (8.75%) and one silverside muscles (1.25%) exhibited pH>6.09 and were classified as possible DFD. Overall, the silverside had better L^* and a^* colour behaviour than the shoulder clod. The sensory tests show that shoulder clods exhibited a better smell, but no significative differences in hardness or taste between muscles were found. The WBSF test showed that silverside meatballs are slightly softer than the ones obtained from the clod shoulder.

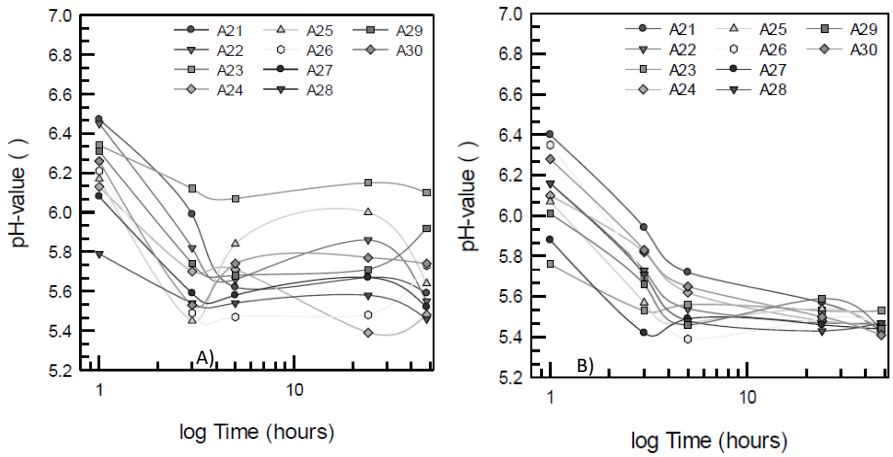

Figure 1. Example of the pH development of shoulder clod (A) and silverside (B) measured from the same animals on the same slaughter day.

IV. CONCLUSION

None of the samples experienced an unusual colour or pH development during the 7-day window. After to the pH_{48} measurement the incidence of possible DFD defects was more probable to happen in shoulder clod than in silverside muscles; however, those samples did not exhibit any exceptional behaviour during maturing, or during sensorial and WBSF tests. Our results showed that silverside muscles had a better colour behaviour and a softer texture than shoulder clod.

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