

## TEMPERATURE DEVELOPMENT IN CARCASSES WITH DIFFERENT SLAUGHTER PROCESSES

Hanne Maribo

Danish Meat Research Institute, Maglegårdsvej 2, DK-4000 Roskilde, DENMARK

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### Introduction

The rate of pH-fall in pork muscles depends on the temperature: the higher the temperature the quicker the pH-fall (Møller et al. 1987). A combination of a low pH (<6.0) and a high temperature shortly after slaughter result in a poorer water holding capacity in the meat and the possible development of PSE (Greaser M.L., 1986).

Different slaughter processes influence the energy status of the carcass. Therefore differences may be observed in temperature, pH and meat quality depending on the slaughter process.

This investigation examines 3 types of slaughter processes:

1. Scalding/singeing
2. Dehiding
3. No surface treatment

The process 'no surface treatment' is not a realistic slaughter process. It has been included in this investigation in order to find out how much energy/heat is developed in the musculature.

The purpose of this investigation is to examine whether different slaughter processes result in different temperatures in hind leg muscles and loin and whether the temperature influences the rate of the pH-fall and the meat quality.

### Materials and methods

All pigs have been delivered from one producer only and were slaughtered at the training slaughterhouse of the Danish Meat Trade College in Roskilde. The pigs were lairaged for approx. 2 hours before slaughter. Each group comprised 30 pigs slaughtered over 2 weeks.

Group 1 pigs were scalded/singed. Group 2 pigs were dehided on the conveyor after debleeding and then transported to the clean slaughter line where they were slaughtered traditionally. Group 3 pigs did not receive any surface treatment. After debleeding they were transported to the slaughter line and slaughtered traditionally. pH and temperature were measured on the slaughterline. 24 hours post mortem temperature and pH<sub>2</sub> were measured in loin and hind leg. Measurements with the MQM meter were carried out in the same positions. Loin chops were cut for determination of drip loss over a period of 24 hours.

### Results

Slaughter weight was the same in all three groups. The average carcass weight and lean meat content in the 3 groups were 74.9, 74.3 and 74.1 kg and 59.1, 59.7 and 58.0% respectively.

The temperature in the loin can be described as follows:

- A difference is observed in level from week to week, the temperature on the slaughter line being higher in week 1 than in week 2. There is no immediate explanation for this.
- A fall of temperature was observed after sticking
- The higher the carcass weight the higher the temperature of the loin

In the biceps femoris muscle the temperature changes with group and week. There is a tendency for scalded/singed pigs to have a 0.4–0.5°C higher temperature than the two other groups.

There is no difference in the temperature of the muscles between the 'dehiding group' and the 'no surface treatment group'. Dehiding does not cause a lower carcass temperature than no surface treatment.

The pH-level in the loin and the biceps femoris muscle (data from one week only) depends on the temperature of the muscle, time of measurement and the slaughter process. Scalded/singed pigs have a pH-level on the slaughter line which is approx. 0.1 – 0.2 pH units lower than that of the two other groups. The pH-level has a tendency to fall after time of sticking and to be lower with higher temperature.

The average meat quality parameters are listed in the table below (values marked with different letters are significantly different within the individual lines).

Group	1. Scalding/singeing	2. Dehiding	3. No surface treatment
1. pH <sub>2</sub> in biceps femoris muscle	5.51	5.56	5.56
2. pH <sub>2</sub> in semimembranosus muscle	5.49 <sup>a</sup>	5.56 <sup>b</sup>	5.56 <sup>b</sup>
3. pH <sub>2</sub> in loin	5.46	5.47	5.47
4. pH <sub>2</sub> in semispinalis capitis muscle	5.80 <sup>a</sup>	5.88 <sup>b</sup>	5.88 <sup>b</sup>
5. Drip loss, loin chops (24 hours) %	1.8 <sup>a</sup>	1.2 <sup>b</sup>	1.0 <sup>b</sup>

There is a tendency towards a lower ultimate pH in scolded/singed pigs. Ultimate pH in the semimembranosus muscle and the semispinalis capitis muscle is 0.1 units lower in the scalded/singed pigs compared to the other two groups. There is no difference in ultimate pH of the loin and the biceps femoris muscle between groups, but the same tendency is observed as for the semimembranosus and semispinalis capitis muscles.

The difference between groups is significant as far as drip loss is concerned. Scalded/singed pigs have a 0.6% higher drip loss than dehided pigs, and a 0.8% higher loss than pigs with no surface treatment.

### Discussion and conclusion

The temperature of the loin decreases after sticking on the slaughterline and is higher with higher carcass weight. This means that in heavy pigs the temperature fall is slower. The larger the muscle the longer time it will take to chill the core of the muscle.

Scalded/singed pigs have a lower pH-level on the slaughterline. This could be because the scalded/singed pigs have their outer layer of muscles heated contrary to pigs from the other two groups. The heating of muscles may cause an acceleration of the pH-fall. The difference in pH-levels may also be explained by the fact that scalded/singed pigs receive a mechanical treatment when being dehaided and black scraped which may affect the muscles and the post mortem processes.

The only meat quality parameter directly influenced by the slaughter process is the drip loss in loin chops. Scalded/singed pigs had the highest drip loss, the other two groups being approx. 30% lower.

There is no difference in temperature and rate of pH-fall on the slaughterline nor in meat quality between dehided pigs and pigs with no surface treatment.

### Literature

Greaser, M.L. 1986: Conversion of muscle to meat in muscle as food, Ed. P.J. Bechtel, pp.37-102

Møller, A.J., Kirkegaard, E., Vestergaard, T., 1987: Tenderness of pork muscles as influenced by chilling rate and altered carcass suspension. Meat Sci. 21, 275-286.