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SYNOPSIS

Effect of muscle temperature soon after slaughter on pork quality: a pilot study

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Abstract. The effect of various environmental temperatures, ranging between 42.5 and 25 °C during the first 2 h after slaughter, on pork quality was studied in longissimus dorsi samples. Higher environmental temperatures resulted in higher lactate and lower pH 2 h after slaughter. Samples kept at higher environmental temperatures (42.5 and 40 °C) showed characteristics typical for pale soft exudative pork.

Key-words: body temperature, environmental temperature, pork, pale soft exudative, drip loss, meat quality.

Introduction. Pale soft exudative pork is the result of rapid decline in pH after slaughter and elevated muscle temperature, which cause denaturation of muscular proteins. Heat production in porcine muscle is increased by stress, particularly in stress-susceptible pigs (Sybesma & Eikelenboom, 1978). With present slaughter procedures, carcass temperature frequently remains high for the first hours after

slaughter and perhaps exacerbates exudative defects (Sybesma, 1963). The present study was designed to determine the effect of temperature after slaughter on pork quality.

Material and methods. From 8 slaughtered crossbred pigs, part of the longissimus dorsi (between 7th and 13th ribs) was removed from the right half-carcase immediately after bleeding. Each sample was divided into 6 chops. After being wrapped in polyethylene bags, the respective chops were stored for 2 h in water baths at temperatures of 42.5, 40, 37, 35, 30 and 25 °C. Control samples from the left half-carcase were left in situ for the same time, during which the carcasses underwent normal abattoir procedures. The pH of experimental and control samples was measured 2 h after slaughter. Subsamples from all samples were analysed for lactate (Boehringer, Mannheim, test kit TC 124842). After the first two hours, all samples were stored for 2 h at 25 °C and 1 h at 15 °C. They were subsequently all kept at 4 °C. Drip losses were estimated 24 h after slaughter and pork quality was examined visually (van der Wal et al., 1983) and colour was evaluated (Hunter tristimulus; L, a, b; angle 2 °; illumination C). After being subsampled and extracted for estimation of transmittance at wavelength 600 nm (a measure of protein solubility; Hart, 1962), alle samples were prepared for the assessment of drip loss during the period 24 to 72 h after slaughter. Heating loss was then measured for samples kept at 75 °C for 50 min.

Results. The pH of samples kept at higher environmental temperatures for two hours after slaughter were significantly lower. The pH ranged from 6.20 at 25 °C to 5.49 at 42.5 °C. The samples kept at the highest temperatures also contained significantly more lactate (content in fresh matter 88.1 and 82.6 $\mu\text{mol/g}$ at 42.5 and 40 °C, respectively) than after storage at lower temperatures and than in control samples (about 35 to 40 $\mu\text{mol/g}$). The content of lactate in the samples kept at 30 (52.0 $\mu\text{mol/g}$) and 25 °C (41.0 $\mu\text{mol/g}$) was not significantly different from that in corresponding control samples. From visual examination, samples kept at 42.5 and 40 °C showed pale soft exudative defects. Colour values indicated the same, values on the L and b scale being higher in these samples. Similarly protein solubility (higher transmittance of extracts) rapidly decreased at higher temperatures. Drip losses till 72 h after slaughter increased with initial temperature from 4.7 to 14.2 %. In general, heating losses (about 28 to 30 %) were not significantly different between temperature treatments nor between experimental and control samples.

Discussion and conclusions. High carcase temperature contributes to pale soft exudative defects of pork (Sybesma, 1963). High temperature after slaughter is sometimes attributable to the pig's condition before slaughter, for instance to malignant hyperthermia in stress-susceptible pigs (Sybesma & Eikelenboom, 1978). Temperatures inside the muscles of many carcasses are above 40 °C, even 42 to 43 °C, an hour after slaughter.

Higher temperatures during the first 2 h after slaughter also increased glycolysis, as indicated by the rapid fall in pH and the rise in lactate. Both objective evaluation

(Hunter tristimulus and transmittance), and subjective evaluation of pork quality 24 h after slaughter indicated pale soft exudative defects (pale colour, high exudation, loose texture, high transmittance of extracts) in the samples kept at higher temperatures (42.5 and 40 °C). Drip losses 72 h after slaughter supported these findings.

Higher temperatures soon after slaughter thus stimulate denaturation of sarcoplasmic proteins, so increasing drip losses and pale soft exudative deterioration of pork.

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Simulation of the production pattern of rape-seed on the basis of a field experiment

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Abstract. A simulation model for growth and development of rape-seed on the ba-