

1:11 The effect of short and long electric stunning times upon pork quality.

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Introduction.

Electric pulses are used on beef- and lamb carcasses for preventing cold shortening by mainly accelerating the drop in pH-value. It was anticipated that long electric stunning times give the same effect on the pig muscles by causing faster reduction of the glycogen content and by creating faster lactate. The electric stunning voltage might have an effect upon the brain itself and thereby increase the catecholamine levels and give "stress meat".

The authors sent a letter containing a question about the "stress effect" of long stunning times to different meat research institutions around the world at a point of time (1983) when a new norwegian electric stunner was going to be constructed. From the answers it was concluded that very little is known about the difference in effect of short and long times.

When reviewing the literature we found that only van der Wal reported that longer stunning times had a negative effect upon the meat quality of pork. But in his tests he used low voltage stunning (90 volts) for longer times than he used 300 volts. The conclusion of van der Wal and the postulates of Blackmore as well as Eikelenboom and Gregory, (1983), was that short stunning times would give better meat quality from a theoretical point of view. But no research results proving this could be reported. Some of the researchers contacted (not mentioned in the reference list), meant that there would be no negative effects at all from longer stunning times.

Materials and methods.

Alltogether 60 norwegian landrace pigs having a living weight of about 105 kilos were used for these tests. The stunning apparatus used gave a 50 herz sinus voltage of 320 volts. The apparatus is constructed by the company Scancontrol. A dutch stunning tongue, made by the company Stoppelberg, having been equipped with a "dead man button" for operators safety, was used.

The stunning apparatus has a buildt in timer and a sensing voltage of 24 volts together with a transformer which can deliver 220, 320 and 380 volts respectively.

Results and discussion.

When looking at the curves showing the pH-values post-mortem, it is seen that the longer stunning times give a faster decrease in the pH-values. It is found that the effect of 12 seconds is about 0,4 pH-units higher than 2 seconds. This is a significant difference (99,9% Student T-test), and is supposed to give an increased incidence of stress meat. As no DFD-carcasses were found, it is likely to believe that the incidence of pale soft exudative meat has increased. (Fabianson, S., Hamm, R., Honikel, K.O. 1984).

Effect of lairage time.

A difference was also found when 19 hours lairage was compared with 0,5 hours lairage. Approximately half of the pigs were kept in lairage with access to water, for about 19 hours before stunning. The other pigs were killed almost immediately upon arrival at the slaughterhouse.

From the curves is seen as expected (Nielsen, N.J. 1980), that longer lairage give less carcasses with fast pH-drop. 19 hours lairage gave a significant (99,9% Student T-test) higher pH-value 15 minutes as well as 30 and 120 minutes post-mortem.

Bone fractures.

When looking at de incidence of bone fractures, we found that 12 seconds stunning time gave three times higher incidence of broken bones than 2 seconds. Also less severe bleedings were observed in the carcasses from pigs being stunned only for 2 seconds.

In the same period of time we carried out another test with electric stunning with 250 volts A.C. 50 herz which showed that we got better meat quality by reducing the stunning time from 12 to 3 seconds. When using 250 volts for 9 seconds, we got bleedings in the pork shoulders because the pigs, when the stunning current started, pressed their shoulders heavily against the walls of the stunning restrainer. These bleedings in the shoulders were reduced to a great extent when the stunning time was shortened to 3 seconds. Extra high frequencies of the stunning current might perhaps reduce the incidence of stress meat. (Swatland 1977).

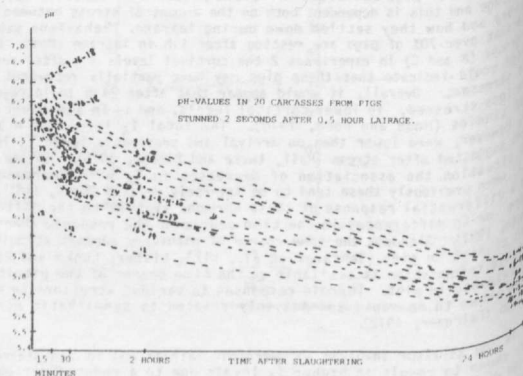
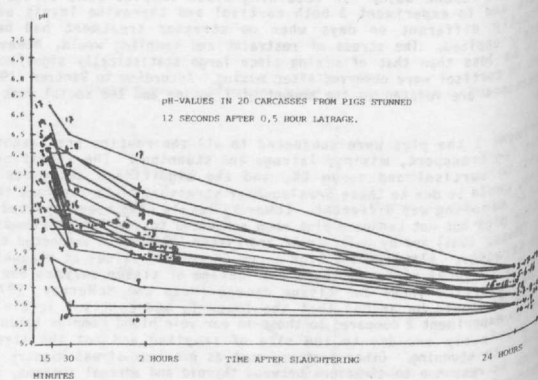
We found that hungry pigs were easy to handle. They are moving faster into the trucks and pens than pigs having just been fed. As mentioned we found no DFD-carcasses during the tests.

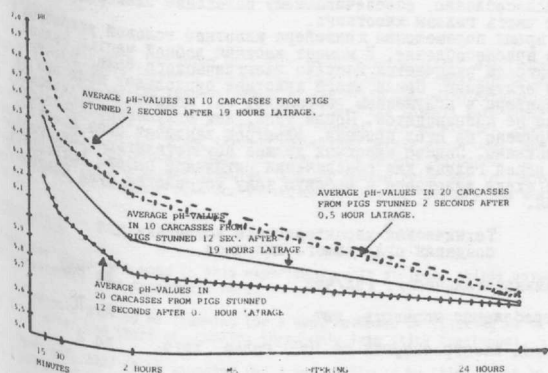
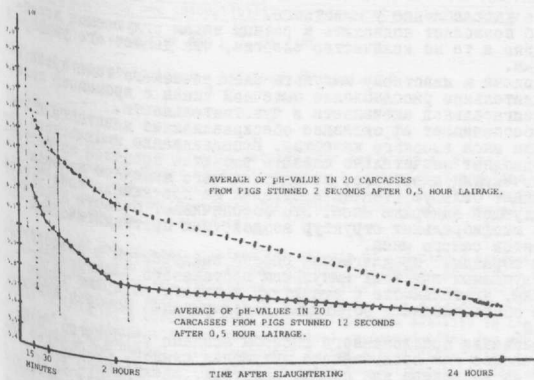
We also found that pigs have to be waked up from their sleep relatively long before they are going to be mooved into the races to the stunning area. If not they are very difficult to handle.

Some of the ideas for animal handling developed by Temple Grandin have just been put into practical operation in a couple of norwegian pig slaughterhouses in order to reduce the losses due to stress.

Conclusions.

From our results we conclude that shorter stunning time (2 seconds) give lower incidence of stress meat, less bleedings and also less broken bones than longer stunning times (12 seconds).





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