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Introduction:

The Regulation (EC) No 853/2004 (Annex III, Chap. VII, point 1) imposes “a temperature throughout the meat of not more than 7°C” but doesn't mention any requirement for the speed and/or the maximal duration of the chilling process. If this process is too long, microbial growth can occur, particularly in the core of the carcass where putrefaction could appear quickly at high temperature, once anaerobic conditions have been reached.

Objectives:

Taking into account that the chilling speed is lower in carcasses with high muscular development, the objective of the present experiment was to study the feasibility of applying some recommendations from literature in large cattle from the Belgian Blue (BB) breed, particularly in the centre of the hindquarter.

Methods

Measurements were made on carcasses of BB large cattle in three slaughterhouses representative of practical chilling conditions usually observed in Belgium (hot carcass weights : 494±49, 473±32 and 476±25 kg in slaughterhouses A, B and C respectively ; European classification types DS2 and AS2). The carcass weight was measured to estimate the weight loss associated with the chilling process.

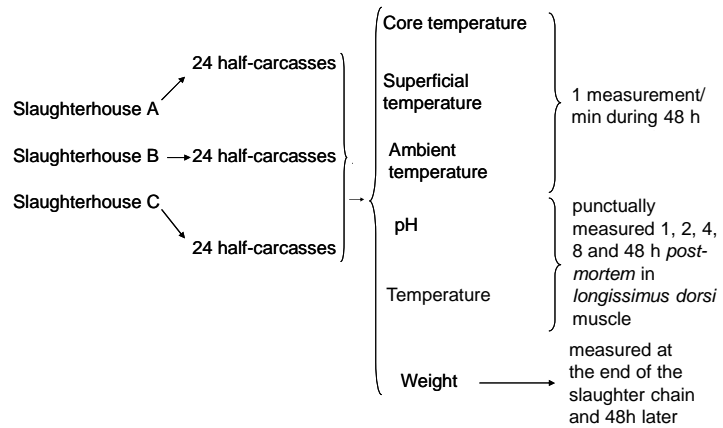


Picture 1: position of probes for the measurement of superficial temperature



Picture 2: position of probes for the measurement of core temperature

Fig. 1: Experimental design



Results & Discussion

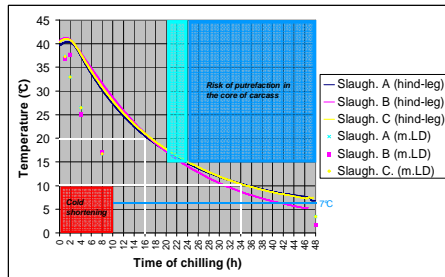


Fig. 2. – Evolution of the core temperature in the centre of the hind-leg and in the *Longissimus dorsi* muscle (m.LD) of 36 Belgian Blue large cattle carcasses in three Belgian slaughterhouses and comparison with some recommendations.

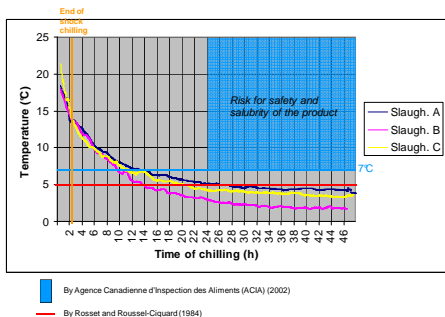


Fig. 3. – Evolution of the superficial temperature of Belgian Blue large cattle carcasses in three Belgian slaughterhouses and comparison with some recommendations.

- In the deepest point of the hind-leg of heavy BB carcasses, the +15°C and +7°C thresholds have been reached after 23 and 48h of refrigeration respectively. This evolution is in accordance with Rosset and Roussel-Ciquard (1984) recommendation (lower than +15°C at 24h) but not with the strongest recommendation (CSIRO, 1989 : lower than +15°C at 20h). Deep putrefaction can therefore not be excluded. By contrast, no risk of “cold shortening” has to be expected.

- The temperature in the longissimus dorsi muscle is largely lower than in the deep-leg (17°C vs 32°C at 8h post-mortem). It can therefore not be used as an indicator of “core temperature”.

- A superficial temperature of +7°C has been reached after 9-12h of refrigeration. This evolution is in conformity with the ACIA (2002) recommendation (lower than +7°C at 24h).

- The weight losses ranged from 2.3 to 2.7 %. The lowest values were observed in slaughterhouses using a shock chilling.

Conclusion:

From this study, it can be concluded that the speed at which the surface of carcasses is chilled seems sufficient to limit microbial growth. The maximal internal temperature of + 7°C required by the European Regulation (EC) No 853/2004 was reached in 48 hours in the three slaughterhouses. However, taking into account some recommendations from the literature, the risk of putrefaction in deep leg has not to be excluded even if no putrefaction was reported by the slaughterhouses. Therefore, it is important to control the temperature in deep leg, particularly in very heavy carcasses (weight higher than 500 kg).

References

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