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Session 33. Improving carcass and meat quality (in cooperation with Cattle Network WG, InterBeef & International Meat Secretariat)

Date: Wednesday 29 August 2018; 8.30 – 12.30
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Theatre Session 33

Modelling beef meat quality traits during ageing by early post-mortem pH decay descriptors

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Previous work has demonstrated that beef carcasses can be promptly and accurately classified into optimal quality and cold-shortened in accordance to the concept of pH/temperature 'ideal window' by using carcass characteristics and early *post-mortem* pH/temperature decay descriptors. The objective of this study was to assess the combined effects of the aforementioned variables on the two main eating quality attributes of meat – namely, tenderness (measured as shear force) and juiciness (measured as cooking loss) – during chill ageing. The pH and temperature in *longissimus thoracis* muscle of 51 beef carcasses were recorded during 24 h *post-mortem*, and decay descriptors were then obtained by fitting exponential models. Measures of Warner-Bratzler shear force and cooking loss were obtained from cooked meat after 3, 8 and 13 days of cold ageing. The fitted mixed-effect models revealed that both meat tenderisation and cooking loss increased with ageing ($P<0.01$) although their rates slowed down in time ($P<0.05$). Beef carcasses with a higher pH (obtained at different endpoints: 1.5, 3.0, 4.5 or 6.0 h *post-mortem*) produced aged meat with increased tenderness ($P=0.013$) and increased water retention during cooking ($P=0.016$) than those of lower pH. Nonetheless, the slower the pH decay rate, as happens in a cold-shortened carcass, the lower the potential for tenderisation ($P=0.038$) and water retention ($P=0.050$) during ageing. Whereas sex affected shear force, with females producing meat of higher tenderness, aged meat of increased water retention was produced by heavier beef carcasses ($P<0.001$). The good fitting quality of the shear force ($R^2=0.847$) and cooking loss ($R^2=0.882$) models and their similarity among the different endpoints post-mortem indicated that both eating quality attributes can be approached by recording the pH decline of a beef carcass during the first 3.0 hours after slaughter.

Improving meat yield and quality in cattle – stand back and let the geneticists take over!

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The contribution of genetic improvement to advances in animal performances is well recognised. A well-designed study in broilers clearly illustrated how genetic improvement contributed up to 90% of the gains in efficiency over a 40 year period with advances nutrition contributing the remainder. Geneticists are (rightfully) blamed with causing the erosion of reproductive performance in dairy cows at the end of the 21st century; geneticists are now (rightfully) acknowledged for reversing the trend in dairy cow reproductive performance with the expectations (substantiated by on-going experimental studies) in countries like Ireland, that the reproductive performance of the modern dairy cow will revert back to the 'good old days' of the 1980's despite phenomenal increases in milk output per cow during that period. All this was achieved because there was an (international) willingness, underpinned by market signals, to correct past mistakes. The benefit of breeding is that it is cumulative and permanent meaning that the gains achieved are compounded with each generation. To be considered for inclusion in a breeding program a trait must fulfil three criteria: (1) importance, (2) exhibit genetic variation, and (3) be measurable or correlated with a measurable traits (ideally at a low cost). Meat yield and quality are certainly important and large exploitable genetic variability in known to exist. The remaining hurdle is the willingness to improve these traits which is largely dictated by the resources required to feed a sustainable, efficient, and effective breeding program. This is largely dictated by access to data from which to generate accurate genetic evaluations. Several alternative strategies exist, one of which includes international collaborative efforts as underway for feed intake and efficiency (also a difficult to measure trait). Although the capital and running cost is actually large, on a per kg of meat produced nationally, the cost is minuscule. Breeding has proven itself to be successful in (rapidly) improving performance; it's time now to apply this skillset to rapidly improving meat yield and quality.