SNAPSHOT

CAN ON-SITE BEEF DARK CUTTING EVALUATION (MONITORING) BE IMPROVED AND VALUE-ADDED?

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Project Description

Dark cutting is problematic and in an effort to discourage its prevalence, processors will generally discount and downgrade the value of these carcasses. Their action is based on a preference for bright red beef and as dark cutting beef fails to match this criterion it is instead considered less fresh and of lower quality than normal beef. This fundamental difference results from dark cutting carcasses having insufficient glycogen reserves to drive *post-mortem* acidification which can impact on beef yield and quality characteristics.

In Australia, a trained operator will judge (grade) the exposed *loin surface* of a beef carcass as dark cutting or otherwise within the first 24 hours *post-mortem*. Effectively, a *single marker muscle* is used to grade and discount the entire carcass even though scientific literature reports pH and glycolytic parameter differences within carcasses and between muscles. As a consequence, there could be an opportunity to recapture these otherwise discount cuts from dark cutting carcasses and instead direct them towards more premium product types.

Project Content

This project explored glycolytic and sensory quality parameter variation within carcasses graded as dark cutting and compared these to normal carcasses. The cuts evaluated were the bolar blade, striploin and topside. Instrumental colour measurements made at grading were assessed in terms of their capacity to identify dark cutting and predict other eating quality traits for these same cuts.

Project Outcome

A comparison of three beef cuts from dark cutting and normal carcasses found that at least the bolar blade and potentially the forequarter of beef carcasses classified as dark cutting did not reflect the negative attributes of the striploin and topside. This outcome was supported by the differences in glycolytic derivatives and pH decline differences observed between these same beef cuts.

Modelling pH and glycolytic parameter (incl. glucose, glycogen, lactate, and glucose-6-phosphate) trends in these same three cuts found their levels continued to change even at 24 h post slaughter. This suggests that conventional grading (12-16 h post-mortem) may be premature and misrepresent carcasses as dark cutting – previous research projects support this observation.

Based on the colour of the exposed *loin* surface between the 12-13th rib, it was found that for carcasses measured at grading, a chroma value equal to or greater than 30.5 was most indicative of the carcass being a dark cutter. This outcome is conditional on a permissible degree of error, that pH > 5.7 is indicative of dark cutting, and colour measurements are made using a Nix Pro Color Sensor™.

Benefit for Industry
Applying these findings, it is reasonable to conclude that components of a dark cutting beef carcass could be *salvaged* to regain a proportion of its undiscounted value. This could mitigate some of the associated economic and environmental impacts incurred from maybe not-so-inferior meat products.

If adopted, the chroma threshold for dark cutting identification could provide an objective alternative to current subjective methods of colour assessment. Furthermore, this approach could avoid many risks associated with inserting a glass pH probe into what is ultimately an edible product (i.e. breakages, etc.)

USEFUL RESOURCES

//   Improving Beef Colour at Grading – Final Report | **2013-3005**
//   Causes and Contributing Factors to Dark Cutting: Current Trends and Future Directions | **2014-1060**