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# The Influence of Time and Temperature at Carcass Boning on Subprimal Temperature, pH, and Color Measurements of New Zealand Beef

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## Objectives

Thirty-two carcasses were selected for this study from a commercial abattoir in New Zealand. One side was hot boned (HB) where fabrication occurred within 90 min post mortem, while the other side was subjected to a traditional cold boning procedure (CB) where the carcasses were chilled overnight and fabricated 17 to 20 h post mortem. Five subprimals were collected from each side, including the strip loin, cube roll, tenderloin, rump, and topside. The subprimals were further fabricated leaving only the *longissimus lumborum* (LL), *longissimus thoracis* (LT), *psoas major* (PM), *gluteus medius* (GM), and *semimembranosus* (SM).

## Materials and Methods

Subjective and objective color evaluation was conducted at two times in the fabrication process. Initial readings were taken when the subprimals were removed from the carcass. Bloom time was approximately 5 min from subrimal excision or from subprimal removal from vacuum packaging for initial and ultimate, respectively. Objective color was taken using a portable Minolta colorimeter (CM-2002; Minolta Camera Co., LTD, Osaka, Japan), averaging three readings per muscle. Subjective color was evaluated using Meat Standards Australia color chips (1A, 1B, 1C, 2–7). Initial temperature and pH were evaluated simultaneously at harvest using a portable handheld probe (TPS Model WP-90, TPS Pty Ltd., Brendale, QLD, Australia). Ultimate measurements were taken at d 2 for the CB subprimals and d 3 for the HB subprimals. Day varied between chilling treatment due to logistical restrictions. Data were analyzed as a split plot design using GLIMMIX procedure in SAS. Data were analyzed by muscle, evaluating the fixed effects of chilling treatment and sampling time. Significance was recognized at $P < 0.05$.

## Results

For subjective color, L*, a*, and b*, the interaction between chilling and sampling time was observed ($P < 0.02$) for all muscles (except PM a*). At carcass fabrication HB muscles were subjectively darker than CB muscles and had lower L*, a*, and b*, indicating HB was darker, less red, and less yellow than CB muscles. A similar trend was observed at steak fabrication; however, the magnitude of differences between HB and CB was greatly reduced. A similar trend to color results was detected for pH and temperature, as the chilling treatment by sampling time interaction was detected ($P < 0.01$) for all five muscles. Subprimals from HB sides had lower initial pH readings, but the CB muscles had lower ultimate pH values compared to their HB counterparts.

## Conclusion

Hot boning resulted in slightly higher, yet still acceptable, ultimate pH in all 5 muscles, which translated to darker muscle color scores, assessed both subjectively and objectively. These differences in color and pH should be considered when processors are implementing either of these carcass chilling and fabrication regimes.