



The Effect of Storage Day on Quality and Shelf Life of 2 Lean Point Formulations and 2 Packaging Types of Fresh Ground Beef

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Objectives

The purpose of this study was to evaluate the effect of days in dark storage on quality and shelf life of two lean point formulations of fresh ground beef products (73/27 and 81/19) displayed in 10 lb chubs and in traditional over-wrapped packages.

Materials and Methods

Cases of 81/19 and 73/27 finely ground, fresh ground beef, packaged in chubs, were obtained from a commercial processing facility 3 d post initial grind and were stored in the absence of light at 32°F. Cases were randomly assigned to storage intervals of 7, 14, 18, 21, 24, and 28 d. Following each assigned storage time 20 4.54 kg chubs and 20 454 g overwrapped packages were prepared for retail display, so that there were 5 replications ($n = 5$) of each lean point and each packaging type at each retail display sampling time (0, 24, 48, and 72 h). For all storage intervals, both lean points and packaging types were evaluated for subjective and objective color every 12 h for the duration of the display time. Samples were evaluated using a trained color panel and a spectrophotometer. Panelists evaluated each package for redness, brightness and %discoloration. The spectrophotometer was used to evaluate L^* , a^* , and b^* values. Five samples of each lean point and packaging type were removed from display at 0, 24, 48, and 72 h. A 50 g representative sample was aseptically removed from each package for analysis of aerobic plate counts (APC) and lactic acid bacteria counts (LAB). Statistical analyses were performed using the PROC MIXED procedure of SAS (SAS Inst. Inc., Cary, NC).

Results

As expected, both subjective and objective color stability declined ($P < 0.05$) as storage and display time increased. However, both lean points displayed in over-wrapped packages became less red, less bright and increased in percent discoloration more quickly than the product displayed in 4.54 kg chubs. Color was determined to be unacceptable for product displayed in chubs after more than 21 d of storage. Overwrapped product maintained acceptable color through 14 d of storage and 48 to 60 h of display and through 18d of storage and 36 to 48 h of display. Color deterioration was so rapid in over-wrapped product stored for 21 d or more that packages were removed from retail display altogether after 48 h of display. Initial APC and LAB microbial counts were high for this product, with counts of more than 4 log cfu/g after 7 d of storage and 0 h of display. APC and LAB counts continued to increase ($P < 0.02$) as days in storage and display time increased, however once product reached 7 logs of bacteria there was no clear trend in the data as microbial counts fluctuated, indicating that the product had reached bacterial spoilage levels. Despite the extremely high microbial counts, product color remained above an acceptable level for more than 21 d.

Conclusion

Overall, these results suggest that product displayed in over-wrapped packaging tends to decline in quality more rapidly than product displayed in chubs. Additionally, if the microbial load of the product were reduced at initial grinding, the shelf life of the product may be extended.