



## Effects of Finishing Diet and Packaging on *Longissimus Dorsi* Color

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**Keywords:** beef color, grain-finished, grass-finished, packaging  
Meat and Muscle Biology 3(2):40

### Objectives

Meat color is extremely influential in purchasing decisions as consumers associate a bright-red color with freshness. The type of finishing diet can influence beef color. Previous studies have shown that grass-finished cattle have darker muscle color than grain-finished cattle. With the use of modified atmospheric packaging (MAP), beef purveyors are able to vary the gas compositions within a package and enhance beef color. However, limited studies have determined the effects of modified atmospheric packaging on grass-finished beef color. The objective of this study was to determine how finishing diet and packaging type affects the color of the *longissimus dorsi* (LD) muscle.

### Materials and Methods

During the stocker period, all of the cattle were on a forage diet. Cattle were then randomly assigned to either a conventional grain-based diet or an alfalfa pasture diet for finishing. Both conventionally and pasture-finished cattle were fed for 91 d. Cattle were slaughtered on the same day at a commercial beef processing facility under normal conditions and chilled for approximately 30 h. After grading, one strip loin from each carcass was collected and transported to Oklahoma State University. At 11 d postmortem, one steak ( $n = 60$ ) from each strip loin was vacuum packaged and randomly assigned to display. Those steaks were then randomly assigned to PVC, HiOx-MAP (80% oxygen and 20% carbon dioxide), or CO-MAP (0.4% carbon monoxide, 69.5% nitrogen, and 30% carbon dioxide) packaging and were displayed under retail conditions

for 5 d. Muscle darkening (MD), muscle color (MC), and surface discoloration (SD) were all analyzed by a trained panel ( $n = 6$ ). MD was evaluated only on d 0 and MC and SD were scored once every 24 h for 0, 1, 2, 3, and 4 d. Lipid oxidation was measured by thiobarbituric acid reactive substances (TBARS) assay on d 4. Data were analyzed using the Mixed Procedure of SAS.

### Results

There was a significant display day by finishing diet by packaging interaction ( $P < 0.05$ ) for muscle color and surface discoloration. There was also a significant finishing diet by packaging interaction ( $P < 0.05$ ) for muscle darkening. Steaks packaged in HiOx-MAP remained the most stable in color and the brightest cherry-red colored throughout display time ( $P < 0.05$ ) compared with other packaging types. PVC was the most discolored ( $P < 0.05$ ) on d 3 and 4 when compared to HiOx-MAP and CO-MAP with the grain-finished PVC packaged steaks showing the most discoloration on d 4. Pasture-finished steaks packaged in CO-MAP displayed the darkest colored muscle ( $P < 0.05$ ) on d 0. Steaks packaged in PVC had a higher amount of lipid oxidation ( $P < 0.05$ ) compared with other packaging types.

### Conclusion

These results indicate that HiOx-MAP more effectively maintains the desired beef color of bright cherry-red for pasture-finished beef. The results also indicate that the use of appropriate packaging type can minimize the losses due to discoloration of steaks from either grain or grass-finished beef.