42 Effects of packaging atmospheres on beef color stability, instrumental tenderness, and cooked color. J. P. Grobbel*[1], M. E. Dikeman[1], M. C. Hunt[1], and G. A. Milliken[2], [1]*Kansas State University, Department of Animal Sciences and Industry*, *Manhattan*, [2]*Kansas State University, Department of Statistics*, *Manhattan*.

Fresh meat color is one of the major factors influencing consumer purchases of meat products, and consumers' overall eating satisfaction is highly dependent upon tenderness. Different packaging types, including modified atmosphere packaging (MAP), affect the color and shelf-life of meat. The objectives of this research were to determine the effects of packaging atmospheres on fresh beef color stability, cooked color, and tenderness. Paired longissimus muscles (n=14) from USDA Select, A-maturity carcasses were assigned to either 14 d tenderness or display and 18 or 28 d tenderness. Loins were fabricated on d 7 postmortem into 2.54 cm-thick steaks. An additional 3 steaks were cut posterior to the first 7 steaks, cut in half, randomly assigned to a packaging treatment, and used for cooked internal color. Full steaks were assigned to initial tenderness or packaging treatments of: vacuum packaging (VP); 80% O_2/20% CO_2 (HiO_2); 0.4% CO/35% CO_2/64.6%N_2 (ULO_2CO); 0.4% CO/99.6% CO_2 (ULO_2COCO_2); 0.4% CO/99.6% N_2 (ULO_2CON_2); or 0.4% CO/99.6% Ar (ULO_2COAr). Steaks packaged in HiO_2 MAP were in dark storage (2°C) for 4 d and all other steaks for 14 d. Steaks were displayed under fluorescent lighting (2153 lux, 3000 K and CRI = 85) for 7 d with instrumental color on d 0 and 7 of display. Trained color panelists (n=10) assigned visual color scores. Steaks for Warner-Bratzler shear force and cooked color were cooked to 70°C in a forced-air convection oven. Steaks used for cooked color evaluation were allowed to cool briefly before being sliced in half and instrumental color taken on the interior of steaks. Steaks packaged in the four ULO_2 MAP blends with CO had no change ($P>0.05$) or increased ($P<0.05$) a* values for fresh meat color. Steaks packaged in VP or the four ULO_2 MAP blends with CO had little or no surface discoloration. Steaks packaged in HiO_2 MAP discolored faster (d 4; $P<0.05$) and 56% more ($P<0.05$) than those packaged in any other packaging treatment. There were no differences ($P>0.05$) in WBSF on d 14 postmortem. However, steaks packaged in HiO_2 MAP were less tender (4.63 kg; $P<0.05$) than other treatments (3.68 to 4.01 kg) at the end of display, but had 10 d less aging time because of a shorter dark storage period. Steaks packaged in HiO_2 had the lowest ($P<0.05$) a* (9.40) values for internal cooked color of all packaging treatments. Steaks packaged in ULO_2COCO_2 (18.43) and in vacuum (18.98) had intermediate a* values while those packaged in ULO_2COAr (20.44), ULO_2CO (20.73), and ULO_2CON_2 (20.91) had the highest ($P<0.05$) a* values. Ultra-low oxygen packaging treatments appear to have better fresh color stability than steaks packaged in HiO_2 MAP and equal or better tenderness. Packaging atmospheres alter internal cooked color, with steaks packaged in HiO_2 MAP exhibiting premature browning. Different packaging atmospheres alter fresh meat color stability and internal cooked color as well as tenderness.