Effect of aging time and retail displaying period with a short-term temperature abuse on color stability of two beef muscles

Derico Setyabrata, Hyun-Wook Kim, Yuan H. Brad Kim
Meat Science and Muscle Biology Lab, Department of Animal Sciences, Purdue University

ABSTRACT
Meat color and tenderness are two most important quality factors affecting consumers’ decision on meat purchasing. Post-mortem meat aging has been widely practiced to improve palatability attributes, but could be adversely related to meat color. In particular, temperature abuse during aging or retail display can negatively affect the color stability of aged meat. The objective of this study was to determine the effect of aging time and short-term temperature abuse during display on color stability of two beef muscles (M. longissimus dorsi, LD and semitendinosus, ST). LD and ST muscles were separated from three beef carcasses, vacuum-packaged and assigned into 4 different aging times (7, 14, 21 and 28 days) at 2°C. After each assigned aging, each sample was cut into a steak, overwrap packaged with PVC film on a tray, and displayed for 7 days at 2°C under light. At 4 d display, temperature abuse on displayed muscles was performed by placing packages at 10°C for 45 min and 20°C for 15 min (total 1 h). Beef aged for 21 and 28d were more sensitive to discoloration induced by temperature abuse. Between two different muscles, ST was rapidly discolored compared to LD. Myoglobin content, non-heme iron content, ferric ion reducing capacity, and lipid oxidation of the steaks after display were determined. Non-heme iron content, ferric ion reducing capacity and lipid oxidation were increasing as the aging time increased. These findings suggest that longer aged beef is more susceptible to discoloration under the temperature abused condition due to reduced antioxidant properties.

KEYWORDS
Beef, Discoloration, Aging, Temperature Abuse, Display