



Quality Differences in Fresh Domestic, Frozen Domestic, and Frozen Imported Goat Meat

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Objectives

Imported goat meat, mostly frozen and from Australia, comprises more than 50% of the goat meat sold in the U.S. The objective of this research was to determine differences in color, water holding capacity (WHC), and yields of leg primal cuts from fresh domestic, frozen domestic, and frozen imported goat leg groups.

Materials and Methods

Frozen whole goat carcasses ($n = 15$) were purchased from a commercial vendor and maintained at 33°C. Kid goats ($n = 20$) purchased from local domestic sources were slaughtered under state meat inspection and chilled overnight at 4°C. Carcasses were evaluated and selected ($n = 15$) based on uniformity and split into cold sides. Right sides were wrapped in multiple layers of 0.6 mil polyvinyl chloride film before freezing at -33°C for 5 d. Frozen imported carcasses and domestic sides were thawed at 4°C for 3 d. The left sides of domestic carcasses were used for fresh domestic samples. Rear legs were removed by straight cuts immediately anterior to the femur-pelvic joint and at the stifle joint (USDA AMS Institutional Meat Purchase Specifications for Fresh Goat Series 11) before vacuum packaging and overnight storage at 4°C. After storing overnight at 4°C, legs were removed from packaging and weighed. A 10 to 20-g sample was taken from the surface of the *Semimembranosus* for WHC (Carver press filter paper technique, 20.7 MPa, 3 min, WHC = exudate area/meat area measured with digital planimeter). Excess fat and connective tissue were trimmed from each leg to make a retail leg cut. After 5 min, color (L^* , a^* , b^*) was measured with a Konica Minolta reflectance colorimeter and hue angle and chroma were calculated. The 15 legs of

each group were divided into 3 batch replications of 5 legs each for cooking to 70°C in a smokehouse with 70% humidity. Data was analyzed with SAS 9.4 Proc GLM (SAS Inst. Inc., Cary, NC) for comparison of batch replications and group means using the Tukey function with significance determined at $P < 0.05$. Paired t tests were conducted for fresh domestic and frozen domestic leg parameters.

Results

Batch within group did not influence ($P > 0.35$) any parameter. Tukey mean comparison showed no differences ($P < 0.08$) in cook yield (84.63%), but lower ($P < 0.01$) drip losses (1.31%) and higher ($P < 0.05$) WHC (2.13) in frozen imported legs than frozen domestic legs (85.98%, 0.91%, 2.43) or fresh domestic legs (84.98%, 0.37%, 2.44). There were no differences ($P > 0.05$) in properties between the fresh and frozen domestic legs with Tukey comparisons. The color values (L^* , a^* , b^* , chroma, and hue angle) were lower ($P < 0.01$) in frozen imported legs (29.92, 12.47, 6.35, 14.00, 0.51) than in frozen domestic legs (34.99, 17.12, 10.14, 20.03, 0.60) and fresh domestic legs (39.24, 19.07, 11.86, 22.47, 0.62). However, when comparing the fresh and frozen domestic legs using paired t tests, the frozen domestic legs had higher ($P < 0.01$) drip and ($P < 0.04$) cook losses and lower ($P < 0.01$) color values than the fresh domestic legs.

Conclusion

Freezing and thawing of goat legs increased drip and cook losses and decreased color values compared with fresh domestic goat meat. Imported frozen and thawed goat meat had higher drip losses and lower color values than frozen and thawed imported or domestic goat meat.