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Carcass Chilling Method Effects on Texture and Cured Color Development of Cooked Sow Sausage

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Objectives

To determine the effect of carcass Rinse&Chill on texture and cured color development of cooked sow sausage in comparison to conventional chilling.

Materials and Methods

Two chilling methods were implemented on carcasses (average hot carcass weight 237.0 kg) from 30-mo old sows. Six carcasses were conventionally chilled (C) and 6 were chilled with Rinse&Chill technology (RC; MPSC Inc.). RC involved vascular rinsing of residual blood using a cold (3°C) isotonic substrate solution (98.5% water; balance: glucose, polyphosphates, glycerine, and maltose). Carcasses were deboned (30 min postmortem) to obtain lean from 3 anatomical locations (shoulder, loin, ham) with each location separately ground, salted (1%, w/w), mixed with dry ice, vacuum packaged, and stored (24 h) before being reground. Samples were vacuum packaged, frozen, and stored (–20°C). Thawed samples were mixed with non-meat ingredients (0.5% seasoning, 0.25% sugar, 10% water, 156 ppm sodium nitrite, additional salt 1%), stuffed into cellulose casings (32 mm), and cooked on an electric grill (endpoint 76.6°C). Color measurements included CIE L*a*b* and reflectance estimators of myoglobin chemical states (deoxymyoglobin, DMb, %R474nm/%R525nm; nitrosylhemochrome, NITHEM, %R650nm/%R570nm). Cooked sausage links were cut (12 mm length, 25 mm diameter) for texture profile analysis (compressed twice, 60%). Cooking loss and pH were also determined. Data were analyzed with PROC MIXED model of SAS (SAS Inst. Inc., Cary, NC) and animal (replication, $N = 6$) served as the RANDOM term.

Results

RC did not affect ($P > 0.05$) cook loss, cooked pH, NITHEM, DMb, or instrumental texture. RC resulted ($P < 0.05$) in lighter (CIE L*, 57.1) and less red (CIE a*, 16.7) cured cooked sausage than C (CIE L* 55.9; CIE a* 17.2). Sausage manufactured from the shoulder lean had the highest pH ($P < 0.05$; 6.26) with no difference between the loin and ham (6.02, 6.01; respectively). Those from the loin had the lowest ($P < 0.05$) cooking loss. Sausages that used shoulder lean had the highest ($P < 0.05$) reflectance estimator of NITHEM, while sausage from the ham had the highest ($P < 0.05$) reflectance estimator of DMb. Sausage from the shoulder and loin were different ($P < 0.05$) in yellowness with the ham being intermediate. Sausage from the loin was the most firm ($P < 0.05$) followed by the ham and shoulder. The shoulder produced the least cohesive ($P < 0.05$) sausage with no difference between loin and ham. Sausages varied ($P < 0.05$) in springiness associated with each anatomical location of the lean (ham0.05) between carcass chilling treatment and anatomical location.

Conclusion

Rinse&Chill technology produced lighter, less red cooked cured sausage with no other influence on the chemical and physical properties. The lower redness presumably was associated with the removal of more residual hemoglobin. However, this technology did not affect the development of the cured meat pink pigment. Of future value would be to determine the cured color stability of sausages made from carcasses processed with Rinse&Chill technology with respect to the potential impact of differences in myoglobin and hemoglobin content.