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Evaluation of 3 Compression Forces Using Pressed Juiced Percentage (PJP) and the Relationship to Consumer Juiciness Ratings

M. M. Kline*, K. V. McKillip, A. K. Wilfong, J. M. Gonzalez, T. A. Houser, E. A. E. Boyle, J. A. Unruh, and T. G. O'Quinn

Animal Science and Industry, Kansas State University, Manhattan, KS, USA

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Objectives

The objective of this study was to evaluate the PJP method utilizing three compression forces and determine the relationship of these values to consumer sensory scores of juiciness.

Materials and Methods

Strip loins (n = 40) were collected to represent five quality treatments: USDA Prime, Certified Angus Beef (CAB; upper 2/3 Choice), Low Choice, Select, and Select from phenotypical Angus cattle (Angus Select). Strip loins were aged 21 d and cut into 2.5 cm thick steaks. Consecutively cut steaks were assigned to either consumer sensory testing or for PJP evaluation at one of three compression forces (4, 8, or 12 kg) and slice shear force (SSF) determination. For testing, steaks were cooked in a convection oven to an internal temperature of 71°C. Following SSF sample removal, steak samples evaluated for PJP were compressed for 30 s at one of the three compression forces as previously described by Woolley (2014). Consumer panelists (n = 112) evaluated paired samples cooked under identical conditions for juiciness using 100 mm line scales (Wilfong et al., 2015).

Results

When compressed at 4 kg, samples had the lowest ($P < 0.05$) PJP values of all compression forces evaluated, with all quality treatments having a similar ($P > 0.05$) PJP value. Conversely, samples compressed at 12 kg, resulted in the highest ($P < 0.05$) PJP values, also with no differences ($P > 0.05$) found among quality treatments. When compressed at 8 kg, CAB and Low Choice samples had lower ($P < 0.05$) PJP values than Select samples. The PJP values at all three compression forces were not ($P > 0.05$) correlated with consumer juiciness scores. However, when evaluating consumer juiciness scores, Prime was rated higher ($P < 0.05$) than all other quality treatments, with all other treatments rating similar ($P > 0.05$) for juiciness. This indicates only minimum amounts of juiciness variation within the population of samples used for this study. This likely contributed to the lack of correlation between consumer juiciness scores and PJP values. Prime samples had the lowest ($P < 0.05$) SSF values and no differences ($P > 0.05$) in SSF were found among CAB, Low Choice, and Select. Also, Angus Select samples had the highest ($P < 0.05$) SSF values. Prime samples had less ($P < 0.05$) cook loss than Select and Angus Select samples. Consumer tenderness ratings were correlated ($P < 0.01$) with SSF (r = –0.37), cook loss was correlated ($P < 0.05$) with consumer tenderness ratings (r = –0.15), and no association ($P > 0.05$) was found between cook loss and consumer juiciness ratings.

Conclusion

Results indicate that modifying the compression force used during PJP testing had a large effect on the observed percentage of juiciness quantified from samples; however, few differences among quality treatment groups were observed. To determine the optimal PJP compression force for consumer juiciness prediction, a greater amount of juiciness variation among samples is required than was observed in the current study.