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Determination of The Repeatability and Accuracy of the Pressed Juice Percentage (PJP) Method at Sorting Beef Strip Loin Steaks into Categories of Known Juiciness

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Objectives

The objectives of this study were to determine the repeatability of the Pressed Juice Percentage (PJP) method of objective juiciness measurement and evaluate the ability of the PJP method to segregate steaks based on the likelihood of being rated "juicy" by consumers.

Materials and Methods

Strip loins (n = 72) of USDA Prime, Low Choice, and Low Select were equally represented. Half of the strip loins within each grade were enhanced to 108% of the green weight with water, salt, and alkaline phosphates. Strip loins were aged 21 d, cut into 2.5-cm thick steaks, paired, and frozen (-20°C) until subsequent analyses. Thawed steaks were cooked to one of three degrees of doneness (DOD): Rare: 60°C, Medium: 71°C, or Very Well-Done: 82°C. All cooked samples were evaluated by either consumer panelists or used for objective measures including Warner-Bratzler shear force (WBSF), Slice Shear Force (SSF), and PJP (moisture loss from sample when compressed at 8 kg of force for 30 s). Consumer panelists' juiciness scores were used to determine the accuracy of threshold values determined by previous work. Samples were considered "juicy" if the mean juiciness score of each sample was greater than the 50 mm neutral anchor on the 100 mm juiciness scale. Steaks were evaluated for PJP and classified into one of four categories based on the probability of a sample being rated as "juicy" determined from previous research: PJP of < 14.64 = < 50% chance of being rated "juicy"; PJP of 14.64 to 18.94 = 50 to 75% chance of being rated "juicy"; PJP of 18.94 to 23.25 = 75 to 90% chance being

rated "juicy"; and PJP of > 23.25 = > 90% chance of being rated "juicy". Moreover, paired samples from strip loins of Prime, Low Choice, Low Select, and enhanced Low Select were prepared under identical conditions for determination of the repeatability of the PJP method. Variance components for repeatability measures were calculated using the GLIMMIX procedure of SAS (SAS Inst. Inc., Cary, NC). The accuracy of the predetermined PJP thresholds (from logistic regression model in previous research) were determined by comparison to the actual percentage of "juicy" samples in the current study.

Results

Results indicated PJP threshold values accurately segregated strip loin steaks by the probability of a sample being rated as "juicy" by consumers. The actual percentage of "juicy" samples in the current study was 41.67, 72.31, 89.33, and 98.08% for the predetermined categories of < 50%, 50 to 75%, 75 to 90%, and > 90%, respectively. The PJP had a repeatability coefficient of 0.70, indicating only 30% of the variation observed was due to sample measurement differences between paired samples. Also, repeatability coefficients of SSF and WBSF were calculated as 0.68 and 0.85, respectively.

Conclusion

Results of this study indicate the PJP instrumental juiciness method is both repeatable and accurate at sorting steaks based on the likelihood of being considered "juicy" by consumers. Moreover, a PJP value of 23.25% is proposed as a "Guaranteed Juicy" threshold, as more than 90% of samples will be considered juicy at or above this level by consumers.