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Profiling the Impact of Visual Degree of Doneness on Palatability Ratings of Beef Strip Loin Steaks Served to Consumers of Differing Degree of Doneness Preferences

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Objectives

The objective of this study was to determine the impact of feeding consumers of varying degree of doneness (DOD) preferences steaks cooked to multiple DOD on their perceptions of beef palatability.

Materials and Methods

Paired Low Choice strip loin steaks (n = 360) were randomly assigned a DOD of either rare (60°C), medium-rare (63°C), medium (71°C), medium-well (74°C), or well-done (77°C). Consumer panelists (n = 283) were prescreened to participate in panels based on their DOD preference of either rare, medium, or well-done. In the first round of serving, consumers were served one sample from each of the five DOD, under low-intensity red incandescent lighting to mask any DOD differences among samples. Round 2 testing procedures were identical to round 1, except consumers were served under white incandescent lights, allowing for the consumers to visually evaluate the DOD of samples during testing. Consumers evaluated samples for tenderness, juiciness, flavor, and overall liking on continuous line scales. Screening the consumers beforehand for DOD preference allowed for a measure of the impact of "missing" the consumer's ideal DOD and quantification of the impact of both under and overcooking steaks on consumer beef palatability ratings.

Results

There were no consumer preference ×DOD interactions or consumer preference effects for tenderness, juiciness, and flavor ($P > 0.05$) when steaks were evaluated under both lighting types. As expected, within the red-light testing, as cooking temperature increased, overall liking decreased ($P < 0.05$). The sensory cue of sight significantly impacted palatability ratings. Within the white-light testing, the consumer preference × DOD interaction for overall liking was marginally significant ($P = 0.078$). Consumers that preferred rare and medium rated rare and medium-rare the greatest ($P < 0.05$) and well-done the lowest ($P < 0.05$) for overall liking. However, as the consumers DOD preference increased, the more their ratings differed than in the red-light test. For consumers that preferred well-done, there were no differences ($P > 0.05$) among DOD for overall liking within the white-light test. But, when tested under the red-light, well-done consumers rated rare and medium-rare with the greatest ($P < 0.05$) overall liking, with well-done having the least ($P < 0.05$) overall liking, being similar ($P > 0.05$) only to medium. As for the change in ratings when compared to the consumers preferred DOD, when steaks were undercooked, they were rated higher ($P < 0.05$) and when steaks were overcooked, they were rated lower ($P < 0.05$), regardless of the consumer's DOD preference. For all ratings, when steaks were cooked below the consumer's preference, there were no differences ($P > 0.05$) among the ratings, all of which were rated higher ($P < 0.05$) than their preferred DOD. Means decreased ($P < 0.05$) as the amount of overcooking increased, with steaks cooked four DOD over the consumer's preferred DOD being rated tougher and lower ($P < 0.05$) for flavor liking than steaks cooked to their preferred DOD.

Conclusion

Regardless of the consumers DOD preference, undercooking had a positive effect versus their preferred DOD, and overcooking negatively impacted ratings. Therefore, it is better for steaks served at restaurants to err on the side of being undercooked to maximize the consumers eating experience.