

RATIONALE FOR CONSUMER PREFERENCES FOR DIFFERENT DEGREES OF DONENESS OF BEEF STRIP STEAKS

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INTRODUCTION

Of the different types of meat consumed, there is one that is cooked to a variety of degrees of doneness - beef. Most other meats are cooked to medium or more doneness. Research shows that the more cooked beef is, the less desirable it is (Cross et al., 1976; Belk et al., 1993), but there are many people that still cook beef at a higher degree of doneness (Savell et al., 1987). Research has never shown why many people still choose a higher degree of doneness when it may be tougher. A two-part study was conducted to answer this question.

MATERIALS AND METHODS

In Phase I, one hundred and seventy individuals completed a questionnaire regarding what degree of doneness in beef strip steaks they preferred and why. Respondents included residents of the Bryan/College Station community and students from Texas A&M University. In the questionnaires, seven degrees of doneness were listed: very rare, rare, medium rare, medium, medium well, well, and very well. Each respondent had the opportunity to express their opinion on the questionnaires why they preferred that degree of doneness specifically for flavor, juiciness, tenderness, color, texture, appearance or presentation, and for any other reasons that they might have. Gender (male or female), age (in years), background (rural/agriculture, non-rural/nonagriculture, or other), main steak preparer (yes or no), main food preparer (yes or no), steaks eaten per two-week period (0 to 2, 3 to 5, 6 to 8, or 9 or more). Information from each completed questionnaire was entered into a spreadsheet program for simple analysis. Comments from the questionnaires regarding the eating quality and visual characteristics and representing each degree of doneness were selected for presentation in this paper.

In Phase II, fifty-one consumers rated overall like, tenderness, juiciness, and flavor on nine-point scales for samples from four different degrees of doneness - medium rare, medium, medium well, and well done - under red lights and white lights. The red lights were turned on to disguise the color differences in the cooked meat, while the white lights allowed the color differences to be evident. The two different lights were used to determine the visual effect that color has, if any, on the consumer. Students and faculty members were recruited from the Kleberg Animal and Food Sciences Center on the campus of Texas A&M.

RESULTS AND DISCUSSION

Only one respondent each marked very rare or very well. For other analyses, these were combined with the rare or well categories, respectively. The dominant degree of doneness preferred was medium rare (n = 68) followed by medium (n = 47), medium well (n = 33), with equal numbers of rare (n = 10) and well (n = 10).

Of all of the other general information recorded from the questionnaires, only gender appeared to have an effect on degree of doneness preference. Males tended to prefer less done meat, while females generally preferred more done meat. No real explanation can be found for this trend.

Comments reflecting what people said about each eating quality attribute and visual characteristic are summarized and reported below. Phase I indicated that those consumers who preferred medium rare or lower categories placed a premium on the eating satisfaction that comes with beef cooked that way. They often stated that the color and appearance did not matter in their choice of degree of doneness. Consumers who preferred medium well or higher often mentioned that the sight of redness or the appearance of blood was unappealing and unappetizing. Often, they preferred these degrees to avoid this even if it meant a less tender and a drier steak. Those who chose medium tended to like the combination or balance of acceptable eating satisfaction with no blood or red showing.

TABLE 1. SELECTED COMMENTS FROM RESPONDENTS AS TO WHY THEY PREFER A SPECIFIC DEGREE OF DONENESS

<u>Rare or less</u>	<u>Medium Rare</u>
"I prefer a somewhat raw flavor."	"Increased beefy flavor - overcooking probably reduces the flavor."
"Increased juiciness with less cooking."	"Allows juices to remain within steak. Well done is too dry - almost no juice is left in meat."
"Gives maximum softness, main component of tenderness."	"The steak can be easily cut with a knife, you don't have to saw through."
"Meat is red, when I eat meat, I like to	"Don't want black and don't want blood

see red in the middle."
 "It's the proper way to eat steak."

"A rare steak looks more like a cut of meat than a burned steak."

Medium

"Well done is too dry, rare is too bloody - I like something in the middle. Medium is juicy enough for me."

"I feel that it removes the 'blood' taste."

"I don't like rare meat and blood-red color is offensive to me."

"It's in the middle!"

"Dry steaks tend to be tough to me, and rare steaks are too raw, not firm enough - medium is just right."

"Too much blood is repulsive - pink is OK for me."

Well or more

"If cooked slow enough it can be as juicy as a medium rare steak."

"I can't stand the taste of blood."

"Will sacrifice tenderness for doneness."

"Well done is more tough than rare cooking. However, I don't like rare cooking in terms of color appearance."

"I think it is safer to eat meat that is cooked all the way through."

"I like well done because of appearance and color."

running out."

"This is the way I was always given a steak when young and any other way, I don't like it."

"Looks more appetizing than a burnt piece of meat."

Medium Well

"I am not a meat lover, and don't like to think that what I am eating was alive and kicking."

"Will sacrifice tenderness for doneness."

"Medium to very rare meat does not appeal to me, visually. To eat it, I would have to not look at it."

"Don't want it to feel alive."

"I don't want it moving or mooing while I eat it."

"My dad told me a long time ago to get medium, so I just always have!"

Analysis of variance for the sensory panel data showed that degree of doneness was the only factor was significant for all of the sensory traits measured. Neither light color nor the interaction between light color and degree of doneness were significant. It appears that the color of the meat when evaluated under the white lights did not seem to impact the evaluations made by the panelists.

Steaks cooked to medium rare were rated the highest for all attributes, while those cooked to well done were generally rated the lowest. This supports the work stated earlier by Cross et al. (1976) and by others that degree of doneness influences the sensory properties of meat. Even though some people prefer their meat more well done, sensory panels still reflect that higher ratings will be given to those steaks that are cooked to medium rare.

TABLE 2. DEGREE OF DONENESS EFFECTS ON SENSORY PANEL RATINGS (NINE-POINT SCALES)

Trait	Degree of doneness			
	Medium Rare	Medium	Medium Well	Well
Overall Like	6.4 ^a	5.5 ^b	5.5 ^b	5.3 ^b
Juiciness	6.5 ^a	5.3 ^b	5.1 ^b	4.5 ^c
Tenderness	6.5 ^a	5.4 ^b	5.9 ^b	5.3 ^b
Flavor	6.2 ^a	5.5 ^b	5.6 ^b	5.4 ^b

a,b,c Means in the same row with different superscripts differ (P<.05).

CONCLUSIONS

Cooking steaks less done results in higher liking in taste tests, but many consumers find the color of these steaks unappealing or even repulsing. Future work should be focused on finding the correct balance between taste and visual characteristics. Attempts should be made to be sure that beef can be cooked to more advanced degrees of doneness and still be highly acceptable to those who oppose the presence of red or bloody color in steaks.

REFERENCES

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