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Study II: Electrically stimulated and hot-processed beef—color and eating qualities

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Study II: Electrically Stimulated and Hot-Processed Beef--Color and Eating Qualities

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Introduction

Hot processing is gaining increased interest in the beef processing industry today because of the previously mentioned processing efficiencies and economic advantages. This study examined the color and eating characteristics of electrically stimulated hot-processed beef compared with beef conventionally chilled and processed.

Procedure

One side of each of 46 carcasses was electrically stimulated continuously for 2 minutes with 400 to 600 volts and 5 amps of AC (60 Hz) current at 1 hr postmortem. The Longissimus (loineye) and Semimembranosus (inside round) muscles were hot boned at 2 hr postmortem and vacuum aged 7 days at 2.2 C (36 F) before steaks were removed. Conventionally treated carcass halves were chilled at 2.2 C, then loineye and inside round steaks were removed 7 days postmortem. A trained taste panel scored steaks for palatability, and half-inch diameter cores were sheared with a Warner-Bratzler shear. Steaks for display were packaged in oxygen permeable film, placed under display lighting for 5 days at 2 C, and color was evaluated by four panelists.

Results

Means for taste panel and shear force are shown in table 1.1. Loineye steaks had similar values for tenderness, flavor, and shear force from electrically stimulated hot-processed and conventionally processed carcasses. But, shear force and taste panel data indicated that electrically stimulated inside round steaks were less tender than conventionally processed round steaks, although taste panel scores for both groups were in an acceptable range. No significant differences in color were found except on the second display day, when electrically stimulated hot-boned loineye steaks were brighter red than their conventionally processed counterparts.

Table 1.1. Taste panel and shear force scores (means) for ESHP^a and Conv^b beef loin eye and inside round steaks.

Criteria	Loin eye		Inside round	
	ESHP	Conv	ESHP	Conv
Taste panel traits ^c				
Muscle fiber tenderness	6.4	6.4	5.7	6.1
Detectable connective tissue	7.1	7.0	6.2	6.4
Juiciness	6.6	6.4	5.3	5.3
Flavor	6.3	6.2	6.0	6.1
Shear force (lb)	2.81	2.99	4.13	3.58

^aESHP = Electrically stimulated and hot-processed.

^bConv = Conventionally processed.

^cScores based on 8 point scale (1=abundant connective tissue, extremely tough, dry or bland flavor; 8=no connective tissue residue, extremely tender, juicy or intense flavor) for each factor.

Taste Panels

The palatability or eating desirability of meat is the ultimate measure of the success of beef production and processing. Taste panels are used to measure this palatability.

There are basically two types of taste panels. When consumer preferences for meat products are wanted, a "consumer taste panel" is used. A minimum of 100 randomly chosen consumers are asked to evaluate meat samples according to how well they like or dislike the samples. When more precise measurements of tenderness, flavor intensity, and juiciness are wanted, a "trained taste panel" is used. Trained taste panels consist of six to 12 persons that have been trained to consistently and accurately detect differences in various meat samples. In both types of taste panels, the cooking and sampling procedures are strictly controlled, and the identity of samples are coded so that the panelists do not know which samples are being evaluated.