PALATABILITY OF BEEF FROM CHAROLAIS CROSSBRED BULLOCK, STEER AND HEIFER CARCASSES

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SUMMARY

The palatability of steaks and roasts from 110 Charolais crossbred carcasses was evaluated in order to compare beef from 38 bullock, 39 steer and 33 heifer carcasses.

Broiled steaks from the three groups were rated similarly in flavor and juiciness attributes by sensory panel. Steaks from the bullock carcasses rated lower in tenderness and had more discernible connective tissue than steaks from steer carcasses; sensory panel ratings on tenderness and connective tissue factors were similar between steer and heifer groups. Tenderness by the Warner-Batzler shear force technique corroborated sensory panel findings. Warner-Batzler shear evaluation of rib roasts showed that the bullock and heifer roasts were less tender than roasts from the steer carcasses. Roasts from bullock carcasses had higher cooking loss than roasts from steer and heifer carcasses.

INTRODUCTION

Young bulls gain faster in the feedlot, on less feed per unit gain and hang up meatier carcasses than steers and heifers when breeding and feeding is comparable. Carcasses from young bulls have less marbling, a darker colored, coarser textured lean and receive lower quality grades than carcasses from steers and heifers. Beef from young bull carcasses is usually somewhat less tender than beef from steers and heifers; this fact is well established as it pertains to British, Brahman and British x Brahman crossbred type cattle. Information was needed on steak and roast palatability differences, if any, among bullocks, steers and heifers of Charolais crossbred breeding.

OBJECTIVE

The purpose of this study was to compare the palatability of beef from bullock, steer and heifer carcasses originating from Charolais crossbred cattle.

PROCEDURE

One hundred and ten carcasses (38 bullock, 39 steer and 33 heifer) produced by breeding British x Brahman (F-1) cows to Charolais bulls provided the steaks and roasts for this study. All cattle were approximately 16
months of age at time of slaughter and had been full fed in drylot for 140
days. Bullock, steer and heifer hot carcass weights were 636, 576 and 573
lb. respectively; yield grades averaged 1.9, 2.5 and 2.3; degree of marbling
averaged Traces minus, Slight minus and Traces; all groups averaged typical
A in carcass maturity. Average USDA quality grades for the bullock, steer
and heifer carcasses were average Standard, low Good and high Standard, re-
spectively.

Palatability determinations. The procedures used for cooking and palat-
ability evaluation of steaks and roasts were those recommended by the
American Meat Science Association's Guidelines for Cookery and Sensory
Evaluation of Meat (1978). These determinations involved sensory panel
evaluations and Warner-Bratzler (W-B) shear force determinations on oven
roasted rib roasts from the 6th to 7th rib location.

Cooking procedures. Each steak was fitted with a thermocouple in the
geometric center and cooked on an open hearth Farberware grill until the
internal temperature reached 70°C, approximately a "medium" degree of done-
ness. Temperatures were recorded on multipoint potentiometer. From each
carcass, one steak was served to the sensory panel and another was used for
shear force determinations.

Rib roasts weighing three to five pounds from the 6th and 7th rib section
were cooked until the center of the ribeye reached 70°C, the ribeye
longissimus muscle) removed and cores taken for shear determinations.

Sensory panel procedures. A seven member, trained sensory panel was
used for evaluation of the broiled steak samples. Each member evaluated two
pieces, and more if needed, for flavor, juiciness, tenderness and detectable
connective tissue. Scales used for these evaluations are shown in footnote,
table 1. The individual scores were averaged for analysis.

Warner-Bratzler shear force procedures. From broiled steaks and the rib-
eye of roast, 1/2 inch cores were removed after the meat reached room tempe-
ration. As many cores as possible, oriented parallel with the muscle fibers,
were removed from each sample. Each core was sheared twice with the Warner-
Bratzler shear device.

Statistical analysis. All data were analyzed using the Statistical
Analysis System (SAS). The statistical methods involved a one way analysis
of variance by sex condition and separation of means by the Duncan's Multiple
Range Test.

RESULTS AND DISCUSSION

Taste panel scores on palatability attributes of steaks and roasts are
presented in table 1. There were no significant differences among groups
in the flavor and juiciness ratings of broiled steak. The lack of flavor
intensity and juiciness may be attributed to the low degrees of marbling
found in these carcasses.

The tenderness rating of broiled steak from bullock carcasses was signi-
ficantly lower than the tenderness rating of steer steak. Broiled steaks
from the bullock carcasses had significantly more connective tissue than steaks from the steer carcasses according to sensory panel scores. Sensory panel scores showed broiled steaks from steers and heifers to be similar. Tenderness of broiled steak by the Warner-Bratzler shear force technique corroborated sensory panel findings.

<table>
<thead>
<tr>
<th>TABLE 1. PALATABILITY OF BEEF FROM BULLOCK, STEER AND HEIFER CARCASSES</th>
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<tbody>
<tr>
<td><strong>Steaks - 12th-13th ribs</strong></td>
</tr>
<tr>
<td><strong>No. of carcasses</strong></td>
</tr>
<tr>
<td><strong>Sensory panel scores</strong></td>
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<tr>
<td>Flavor</td>
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<tr>
<td>Juiciness</td>
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<tr>
<td>Tenderness</td>
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<tr>
<td>Connective tissue</td>
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<tr>
<td>W-B shear force, lb</td>
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<tr>
<td><strong>Roast - 6th &amp; 7th rib</strong></td>
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<tr>
<td><strong>No. of roasts</strong></td>
</tr>
<tr>
<td>W-B shear force, lb</td>
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<tr>
<td>Cooking loss, %</td>
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</tbody>
</table>

<sup>a</sup>Only those means in a given row followed by different superscripts are significantly different (P<0.05).

Flavor intensity rated with 3 designating moderately bland; 4, slightly bland; 5, moderately intense, etc.

Juiciness rated with 4 designating slightly dry; 5, slightly juicy; 6, moderately juicy, etc.

Tenderness rated with 4 designating slightly tough; 5, slightly tender; 6, moderately tender, etc.

Connective tissue rated with 4 designating moderate amount; 5, slight amount; 6, traces, etc.

Rib roasts, after cooking, were evaluated for tenderness by the Warner-Bratzler shear force method. Bullock and heifer roasts were significantly less tender than the steer roasts, as may be noted in table 1. Roast from bullock carcasses were expected to be less tender but there is no explanation as to why the heifers differed from steers in roast tenderness.

Roasts from the bullocks lost 27.2% in cooking while roasts from steers and heifers lost 24.9 and 25.1%, respectively. The higher cooking loss of the bull roasts may be attributed, in part, to their smaller amounts of marbling and fat cover.