

Project Summary

Tenderness of Veal Shoulder Muscles During Cooler Aging – Phase I

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Background

The veal industry strives to meet consumer demands for ‘fresh, never frozen product’ and consequently much veal is sold without a significant postmortem aging period. Researchers continue to study the effects of aging in beef, but few have looked at the effects of aging on veal. A recent study was completed to determine physical and sensory characteristics of the veal shoulder to determine possibilities to add value to the veal shoulder. The purpose of this study was to determine the effects of aging time on the tenderness of veal shoulder muscles.

The objectives of this project were to:

1. Establish the cutting yields for veal shoulder muscles in commercial plants.
2. Determine the Warner-Bratzler shear response of veal shoulder muscles to aging.

Methodology

Thirty-six paired veal shoulders from two processing facilities were fabricated and six muscles were obtained from each: *M. complexus* (COM), *M. pectoralis profundus* (DEP), *M. infraspinatus* (INF), *M. serratus ventralis* (SEV), *M. supraspinatus* (SUP) and *M. triceps brachii* (TRB). Each pair of muscles was assigned to one of six comparison treatments from four aging periods: 3 days, 10 days, 17 days and 24 days. Due to weather delaying a shipment, muscles from one facility that were assigned to 3 day treatment were shifted to 5 day.

Upon arriving at Loeffel Meats Laboratory at the University of Nebraska-Lincoln, muscles were stored at 38°F for the defined aging period and then frozen at -8°F. Muscles were thawed 24 hours and paired muscles were cooked side-by-side on Hamilton Beach HealthSmart Electric indoor grills. Samples were allowed to cool for 4 hours at 38°F. Six-1/2 inch cores were taken from each sample and Warner-Bratzler shear force (WBS) was determined using an Instron Universal Testing Machine (Instron Corp. Canton, MA). Treatment allocation was completed in a balanced incomplete block design and analyzed using the LSMEANS function of PROC GLIMMIX in SAS (SAS Inst. Inc, Cary, NC). Carcass within plant and side within carcass and plant were treated as random effects.

Findings

The six muscles removed accounted for just over 25% of the weight of the shoulder. Another 12% was from the remaining portion of the osso buco. The osso buco is commonly removed from the foreshank and that portion which remains in the veal shoulder is seldom identified as such. A marketing opportunity might exist to capture this unused portion of the osso buco, especially since this cut brings such high value per pound. Approximately half of the osso buco from the shoulder could be sold in this manner. The mean fabrication time to muscle bone the veal shoulder was 10 minutes (within 60 seconds) for the two processing facilities. In each case, a professional meat boner worked independently at a separate table in the plant to harvest the muscles.

Because only half of the shear force values are available in Phase I, overall effects due to muscle and aging have not been statistically evaluated. However, after examining overall means for the muscles that have been tested, it appears there will be differences among muscles and across aging periods as some of the remaining muscles are expected to be much more tender than those reported here. There were no statistical differences found between the aging periods of the COM and DEP

muscles, but it should be noted that there was a general numerical decline with aging for these muscles. The SUP at 3 days was only statistically different than at 24 days aging. Due to low sample numbers when considering the muscle-specific effects, there were little to no differences in aging periods. However, there was a clear trend for improvements in SFV from 3 days to 10 days or longer for the SUP and the COM. The DEP did not respond to aging.

Mean WBS (kg) values for each muscle by aging period.

Aging	COM	DEP	INF	SEV	SUP	TRB
3	3.66 ^a	3.78 ^a	na	na	4.28 ^b	na
5	3.80 ^a	3.57 ^a	na	na	4.24 ^b	na
10	3.40 ^a	3.65 ^a	na	na	4.00 ^{ab}	na
17	3.41 ^a	3.69 ^a	na	na	3.81 ^{ab}	na
24	3.48 ^a	3.61 ^a	na	na	3.62 ^a	na

^{a-b} Means within a given column with common superscripts do not differ significantly ($P > 0.05$)
na = shear force data not yet available.

Implications

Significant improvements in tenderness were observed with increased aging for two of the three muscles reported here. The largest decline in shear force occurred during comparison of the 3 and 10 days aging with additional improvements found up to 24 days. The brisket had the least response to aging and the complexus and supraspinatus muscles demonstrated a similar benefit from aging. In addition, the osso buco has new marketing opportunities to capture unused portions.

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