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Effects of Aging on Veal Shoulder Muscles

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Summary

Six muscles were attained from 36 paired veal shoulders and each pair was assigned to one of six aging comparisons. After aging, muscles were cooked and evaluated using Warmer Bratzler shear force. The largest decline in shear force occurred during comparison of 3 and 10 days aging with additional improvements found up to 24 days. The m. infraspinatus was the most tender muscle; the m. supraspinatus *was the toughest. The* m. serratus ventralis *had the greatest response to aging and the* m. pectoralis profundus *(brisket) had the least.*

Introduction

The veal industry strives to meet customer demands for "fresh, never frozen product"' and consequently much veal is sold without a significant postmortem aging period. Much research has been and continues to study the effects of aging in beef, but little has looked at the effects 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 (Sullivan *et al*., *2008 Nebraska Beef Report* pp. 112-113). This purpose of this study was to determine the effects of aging time on tenderness of veal shoulder muscles.

Procedure

Thirty-six paired veal shoulders from two plants were fabricated and six muscles were attained 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, 10, 17, and 24 days. Due to weather delaying a shipment, muscles from one plant that were assigned to 3-day treatment were shifted to 5-day. Upon arriving at Loeffel Meat Laboratory at the University of Nebraska–Lincoln, muscles were stored at 38ºF for the defined aging period and then frozen at -8ºF. 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 38ºF. Six-1/2 in cores were taken from each sample and Warner-Bratzler shear force (WBS) was determined using an Instron Universal Testing Machine (Instron Corp. Canton, Mass.). 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, N.C.). Carcass within plant and side within carcass and plant were treated as random effects.

Results

Muscle and aging main effects ($P < 0.001$) for both traits were significant. The INF was the most tender muscle and the SUP was the toughest. The mean WBS declined with aging. Muscles aged 3 days was statistically tougher than 10 days ($P < 0.05$) and muscles aged 24 days had statistically lower WBS than all period but 17 days aging ($P < 0.05$). The 3- to 10-day showed the greatest decline in shear force. There were no statistical differences found between the aging periods of the COM, DEP, and TRB ($P > 0.05$) but it should be noted there was a general numerical decline with aging for these muscles. At 3 days, the INF was tougher than 5, 17, and 24 days aging ($P < 0.05$). The SEV had a higher WBS at 3 days than all other aging periods ($P < 0.05$). The SUP at 3 days was only statistically different than 24 days aging ($P = 0.004$). Due to the lower sample numbers when looking at the muscle specific effects, there were little to no differences in aging periods but when evaluating the overall aging effects, improvements could be made in increasing aging from 3 days to 10 days or longer. The veal industry could improve the overall tenderness of veal shoulder muscles and consequently improve eating characteristics by introducing a postmortem aging period.

Table 1. Mean WBS (lbs) values by muscle and by aging period.

Muscle	WBS	Aging	WBS
INF	6.03[a]	3	8.12[d]
TRB	6.91[b]	5	7.70[cd]
SEV	7.59[c]	10	7.48[bc]
COM	7.81[cd]	17	7.26[ab]
DEP	8.05[d]	24	7.02[a]
SUP	8.78[e]		

[a-e]Means within a given column with common superscripts do not differ significantly ($P > 0.05$).

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Table 2. Mean WBS (lbs) values for each muscle by aging period.

Aging	COM	DEP	INF	SEV	SUP	TRB
3	8.05[a]	8.32[a]	7.00[b]	8.91[b]	9.42[b]	7.11[a]
5	8.36[a]	7.85[a]	5.59[a]	7.70[a]	9.33[b]	7.33[a]
10	7.48[a]	8.03[a]	6.16[ab]	7.57[a]	8.80[ab]	6.89[a]
17	7.50[a]	8.12[a]	5.85[a]	7.02[a]	8.38[ab]	6.75[a]
24	7.66[a]	7.94[a]	5.57[a]	6.75[a]	7.96[a]	6.49[a]

[a-b]Means within a given column with common superscripts do not differ significantly ($P > 0.05$).

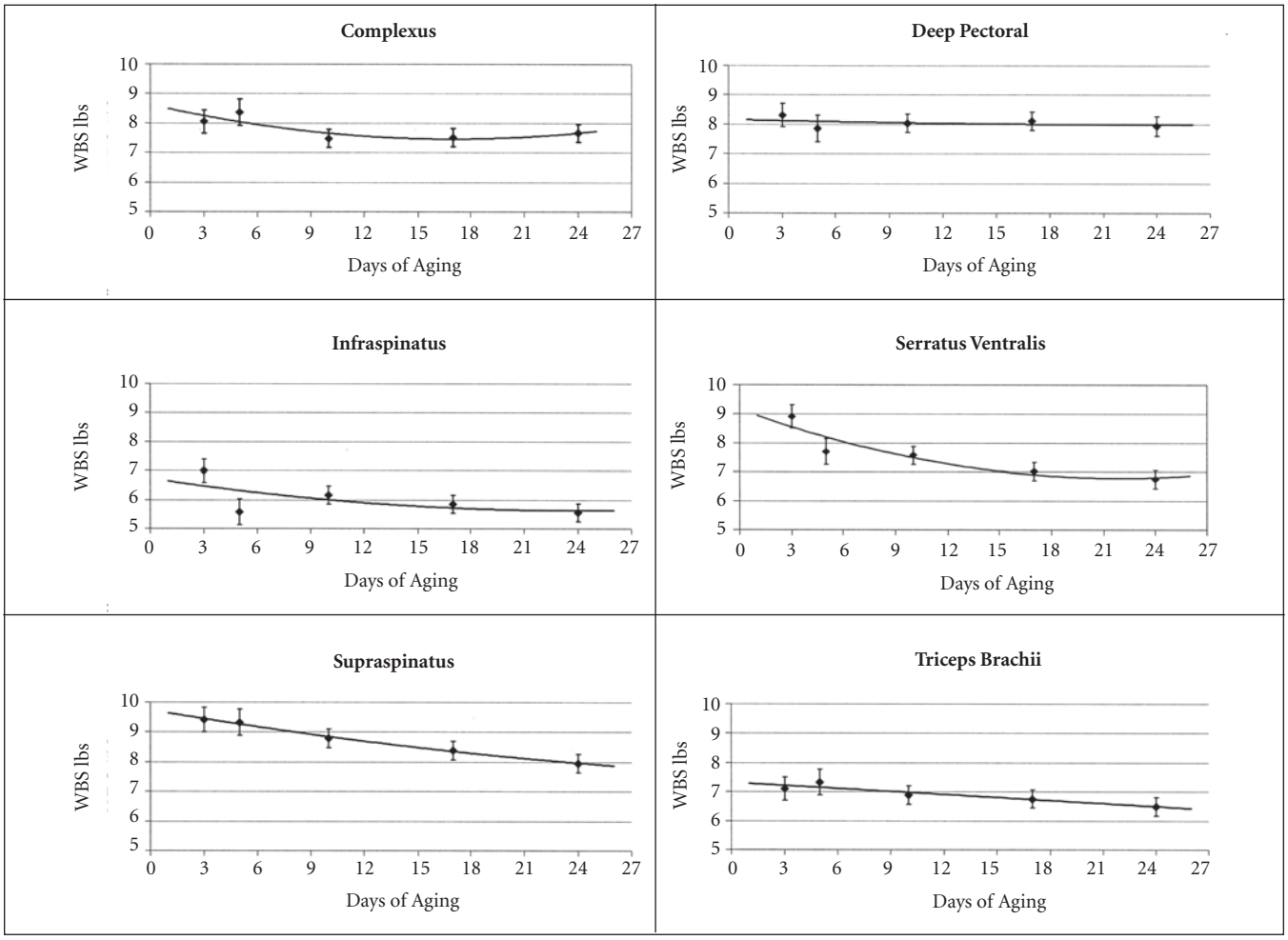

Figure 1. Aging effects on individual muscles.