

# Postmortem Degradation of Desmin in Specific Muscles from the Beef Round

## A.S. Leaflet R2395

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### Summary and Implications

Desmin degradation provides an indication of the extent of protein degradation that occurs during aging in postmortem muscle. The vastus lateralis had the highest amount of desmin degradation at 24 hours. However, the vastus lateralis had no change in desmin degradation over time. This provides evidence that the majority of degradation in the vastus lateralis occurs within 24 hrs postmortem. Previous data from our lab has shown that after this point, further aging of this muscle is not be highly beneficial because little additional tenderization occurs. While the semimembranosus did have a high amount of desmin degradation at 7 days it also contains a high amount of connective tissue. This connective tissue will make the semimembranosus less tender regardless of the amount of degradation. The gracillus and vastus intermedius had an increase in desmin degradation over time. Aging these cuts longer may provide us with a tender product that could be marketed as an individual cut. While the muscles of the round are treated similarly, each muscle has its own individual rate and extent of desmin degradation. Given that these biochemical differences exist, these muscles need to be evaluated individually to optimize the tenderness in each cut.

### Introduction

The muscles of the round traditionally receive the same treatment with regard to aging. However, being able to identify which of these muscles could be removed or aged differently in order to create a cut that will be accepted by consumers as tender could increase the value of the round. Desmin degradation provides a good indication of overall degradation of proteins in postmortem muscle during aging. Muscles with higher amounts of protein degradation tend to be more tender than muscles that have little protein degradation. By measuring desmin degradation as an indication of overall protein degradation in the muscles of the round we can identify differences that arise throughout aging. Identifying differences in rate and extent of desmin degradation in muscles of the round can provide insight into the aging time needed for each muscle to reach its acceptable tenderness for consumers.

### Materials and Methods

Ten market weight beef cattle were harvested, and muscles were removed from both sides of the carcasses at 24 hours postmortem. Muscles removed included the longissimus dorsi (loin; reference) and the following muscles from the round: gracillus (cap), adductor (top round), semimembranosus (top round), sartorius (side muscle), vastus lateralis (knuckle), and vastus intermedius (knuckle). Steaks were aged at 4°C to 24 hours, 7 days or 14 days postmortem in vacuum packages. Degradation of the protein desmin was determined using western blot analysis.

### Results and Discussion

At 24 hours postmortem, the vastus lateralis had a higher amount of desmin degradation ( $P = 0.03$ ) than all muscles except the semimembranosus. The semimembranosus tended to have ( $P = 0.07$ ) more degradation than all other muscles at 7 days. At 14 days no differences ( $P > 0.05$ ) were detected between any of the muscles in amount of desmin degradation. Further analysis of desmin degradation was done by analyzing changes in the amount of degradation over time within each muscle. At 24 hours the adductor tended to have less desmin degradation ( $P = 0.10$ ) than at 14 days. At 24 hours in the semimembranosus, gracillus, vastus intermedius, and longissimus dorsi there was less desmin degradation ( $P < 0.05$ ) than at 7 and 14 days. While in the vastus lateralis and sartorius no difference in ( $P > 0.05$ ) desmin degradation occurred over time. The muscles from the round exhibit significantly different biochemical characteristics which in turn relate to and may reveal possible indicators for the tenderness, water holding capacity, and the overall protein degradation of these muscles.

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