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Effect of slaughter age between 5 and 14 months on the quality of sheep meat with a specific focus on collagen concentration and solubility

A thesis presented in partial fulfilment of the requirements for the degree of

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Abstract

In New Zealand, pasture-raised lamb is considered the highest quality sheep meat product while hogget is a downgraded product considered to be of poorer quality. The objectives of this study were to investigate the difference in meat quality between sheep slaughtered at 5, 8 and 14 months-of-age. This study also aimed to develop an assay to measure collagen concentration and solubility and to compare shear force to collagen concentration and solubility for meat from sheep slaughtered at 5, 8 and 14 months. Sixty Romney crossbreed rams born in the spring of 2015 were allocated to one of three slaughter age groups: 5-group (n=20), 8-months group (n=20) and 14-months group (n=20). The ram lambs were grazed together on perennial ryegrass-based pasture. At slaughter, the loin (*Longissimus lumborum*) from the left side of the carcass was excised, chilled for 24 hours and then frozen. Shear force, pH, colour, driploss, myofibrillar fragmentation index, sarcomere length, soluble collagen, insoluble collagen and total collagen were measured on the loin. *Longissimus lumborum* muscle from the 5-months group was darker (P=0.045) with higher pH (P<0.001) than 8 and 14-months groups. *Longissimus lumborum* muscle from the 14-months group was redder (P<0.001), yellower (P<0.001) with higher intramuscular fat (0.003), shorter sarcomere length (P<0.001), lower collagen concentration (P=0.020) and lower soluble collagen in percentage (P=0.007) and in g/100g fresh weight (P=0.008) than 5 and 8-months groups. The peak shear force was lower at 14 months, intermediate at 5 months and greater at 8 months (P<0.001). *Longissimus lumborum* muscle from the 8-months group had greater drip loss (P<0.01) than 5-months group and 14-months group. The results suggest that slaughtering sheep at 14 months could have benefits on eating quality due to an increase in intramuscular fat.

Keywords*:* lamb; slaughter; age; meat; quality

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