

ABSTRACT

Histological Contribution of Collagen Architecture to Beef Toughness

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The relationship between shear-force value and collagen architecture of connective tissue of the longissimus thoracis (LT) muscle of Japanese Black (n = 10) and Brown (Kumamoto) (n = 5) steers (body weight: 688.4 +/- 8.6 kg as average and standard error) was investigated. There were negative correlations between the shear-force value and lipid content (n = 15, R(2)= 0.3709, P < 0.01) and protein content and lipid content (n = 15, R(2)= 0.6748, P < 0.01). Shear-force value and collagen content (n = 15, R(2)= 0.4344, P < 0.01) were positively correlated. In scanning electron microscopic photographs of the macerated preparation, the perimysium of the high-lipid LT muscle was broken down compared with the low-lipid LT muscle. The endomysium in all LT muscle fibers showed similar architecture. The fine surface cover of reticular collagen fibers around an adipocyte was observed in the high-lipid LT muscle perimysium. These results suggested that the shear-force value of the LT muscle was related to change in collagen architecture and of the perimysium in particular.

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