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Influence of oxidative damage to proteins on meat tenderness using a proteomics approach

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Abstract

The objective of this study was to evaluate the association between oxidative damage to proteins (represented by protein carbonylation) and beef tenderness. Three experimental groups were selected by shear force (SF): tender (38.2 ± 2.9 N), intermediate (51.9 ± 6.8 N), and tough meat (74.5 ± 7.8 N). Two-dimensional electrophoresis with hydrazide fluorophore derivatization was used. The structural proteins actin (ACTA1), myosin (MYL1 and MYL3), desmin (DES) and troponin T (TNNT1 and TNNT3), antioxidant proteins (PRDX1, PRDX2 and PARK7) and heat shock proteins (HSPB1, CRYAB and HSPB6) showed an increase in the oxidative damage in tender meat when compared to the intermediate and tough meat ($P<0.05$). Decrease in oxidative damage of the metabolic enzymes (TPI1, GAPDH and ENO3) were observed in tender meat group ($P<0.05$). The present results suggest that oxidation act on the proteins of different metabolic pathways and consequently affect meat tenderness in Angus crossbred cattle.