

**Title** The effects of high oxygen modified atmosphere packaging on protein oxidation of bovine *M. longissimus dorsi* muscle during chilled storage

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#### **Abstract**

Modified atmosphere packaging (MAP) extends the shelf life of beef, especially in the context of visual colour. High O<sub>2</sub> MAP (70–80%) may cause quality deterioration through lipid and protein oxidation, the latter linked to a reduction in meat tenderness. The objective of this study was to investigate the effects of MAP in comparison to vacuum packaging (VP) on protein oxidation and subsequent tenderness of LD (*M. longissimus dorsi*) beef steaks during chilled storage (4 °C) of periods up to 14 days. Steaks were analysed for carbonyl content, free thiol groups, drip loss, Warner–Bratzler shear force (WBSF) and SDS–PAGE of extracted myofibrillar proteins. Free thiol groups were lower in high O<sub>2</sub> MAP (80% O<sub>2</sub>/20% CO<sub>2</sub>) steaks, after 14 days of storage, indicating protein oxidation compared to VP steaks. SDS–PAGE (non reducing conditions) showed the presence of high molecular weight cross linked myosin heavy chain aggregates in the high O<sub>2</sub> atmosphere packaged steaks, which were absent in VP steaks