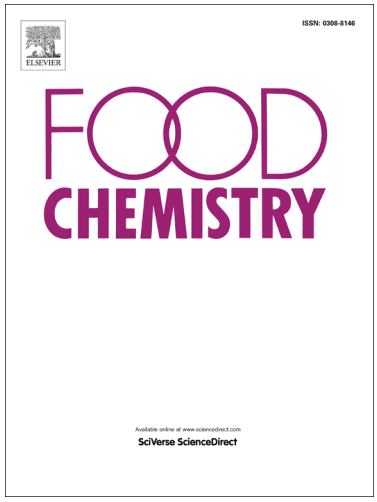

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Reverse phase protein arrays for the identification/validation of biomarkers of beef texture and their use for early classification of carcasses

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Running title: Protein biomarkers as discriminators of beef texture

Abstract

The validation of biomarkers and tools for the prediction of beef texture remains a challenging task. In this study, reverse phase protein arrays (RPPA) quantified 29 protein biomarkers in the m. *Longissimus thoracis* of Charolais cattle sampled early *post-mortem.* Myosin heavy chain 1 (MHC1, slow-oxidative fibers) and Retinal dehydrogenase 1 (ALDH1A1, oxidative enzyme) discriminated between tender and juicy *vs.* tough meat with residues classes and are validated as prime biomarkers of beef texture. Several proteins belonging to energy metabolism, heat shock and oxidative stress, cytoskeletal, cell signaling and apoptosis were related with tenderness. Among the unusual proteins, four and a half LIM domains 1 (FHL1) and Tripartite motif protein 72 (TRIM72) correlated respectively negatively and positively with beef tenderness. Principal component regression was used for the first time to explain beef texture traits using biomarkers. The results are very promising as they revealed sophisticated mechanisms behind the tenderizing process.

Keywords: Biomarkers; RPPA; Meat texture; young bulls; Relationships; Clustering