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CONSTRUINDO SABERES, FORMANDO PESSOAS E TRANSFORMANDO A PRODUÇÃO ANIMAL

INFLUENCE OF HSP90, HSP70, CO-CHAPERONE CDC37 AND STI1 PROTEINS ON MEAT TENDERNESS IN NELLORE CATTLE

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The objective of this study was to analyze the association of the proteomics with meat tenderness groups of Nellore cattle. A population of 90 animals of the Nellore breed with mean initial weight of 390 ± 37 kg was used in an experimental feedlot. Next, the animals were sent for slaughter with mean final weight of 550 ± 75 kg and 27 months of age and were slaughtered on the same batch of slaughter in accordance with guidelines for the Humane Slaughter of Cattle. After slaughter, the carcasses were cooled for 24 h and 2.54 cm thick *Longissimus thoracis* muscle samples were collected between the 12th and 13th rib of each animal. The population was separated in three experimental groups of moderately tender meat (SF = 3.9 ± 0.7 kg, MFI = 55.7 ± 9.0; n = 15), moderately tough meat (SF = 5.6 ± 0.7 kg, MFI = 50.4 ± 13.9; n = 20) and very tough meat (SF = 7.9 ± 1.4, MFI = 40.1 ± 8.9; n = 15) using shear force (SF) and myofibrillar fragmentation index (MFI) analysis. The groups were separated in subgroups using the principal component analysis (PCA) with 5 animals/each (pool). Proteomic analysis was performed based on the separation of proteins by two-dimensional electrophoresis (2D-PAGE) and characterization by electrospray ionization mass spectrometry (ESI-MS/MS). 220 spots were detected by 2D-PAGE gel image analysis. A total of 34 proteins identified presented a significant difference ($P<0.05$) in the comparative analysis between the groups. Heat shock proteins Hsp90-alpha (HSP90AA1), Hsp90-beta (HSP90AB1), Hsp701A (HSPA1A), Hsp701B (HSPA1B) and Hsp701L (HSPA1L), and co-chaperone Hsp90 co-chaperone cdc37 (CDC37) and stress induced phosphoprotein 1 (STI1) showed up regulated ($p<0.05$) in moderately tough meat and very tough meat when compared to moderately tender meat. The Hsp family exerts antiapoptotic function and can be activated to protect cellular proteins against the denaturation of structural proteins. Protein CDC37 participates in the stabilization and stimulation of the activity of the Hsp90 antiapoptotic complex, and co-chaperone STI1 acts as an adaptor between the main chaperones, Hsp90 and Hsp70. Considering the negative association between Hsp70 and Hsp90 observed in the present study, it is possible to infer that the co-chaperones CDC37 and STI1 were induced by post-slaughter stress. This fact extended the functional range of Hsp70 and Hsp90,

protecting and preserving the integrity of myofibrillar proteins against proteolytic degradation, which resulted in meat with greater SF values.

Keywords: beef cattle, shear force, 2D-PAGE

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