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Influence of Heat Shock Protein Activity on the Beef Tenderness during Aging

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Objectives

The aim of this study was to evaluate aging effects on tenderness and Heat Shock Proteins activity of beef muscle.

Materials and Methods

Were evaluated 303 F1 immunocastrated steers cross cattle (Nellore × South African Simmental), aged 18.0 ± 2.0 mo and live weights at slaughter of 500 kg. After 24 h post mortem, two 2.5 cm steaks were collected at the 12th and 13th ribs of the Longissimus muscle. The steaks were individually identified, vacuum packaged and aged for 1 and 14 d. Also, in each aging time, 1 piece of meat was cut and immediately frozen in liquid nitrogen for further Heat Shock Protein (HSP) analysis. The meat samples were analyzed for Warner Bratzler Shear Force (WBSF) according American Meat Science Association (1995) and the HSP quanti-

fication were determined by Bovine HSP 27 and HSP 70 ELISA kits (Mybiosource). The total of protein content was calculated by Bradford method. Beef samples were classified into 2 groups according WBSF values at 14 aging days: Tender (< 4.0 kg) and Tough (> 5.2 kg) and after then, were selected 20 samples from each group for HSP quantifications. Data were analyzed using GLM procedures of SAS (SAS Inst. Inc., Cary, NC), LS MEANS statement and the TUKEY adjustment were used for mean separation with an α level of 0.05 (Version 9.2, SAS Inst. Inc., Cary, N.C.).

Results

As expected, WBSF values ($n = 300$) at 14 aging days from Tender group were smaller (4.2 kg) than Tough group (5.3 kg; $P < 0.05$). The HSP 27 values decreased from 1 to 14 aging days inside the Tender and Tough groups, but no differences were detected between groups at the same aging day. With respect of the HSP 70 values, were observed differences only inside the Tender group and instead of HSP 27, the values increased from 1 to 14 aging days (Table 1).

Conclusion

In conclusion, there are no evidence of relationship between HSP 27 activity and meat tenderness but with respect to HSP 70 activity, more studies should be conducted for elucidate this question.

		Aging Time			
		1 day		14 days	
		Mean	SEM	Mean	SEM
HSP 27	Tender	185.54 ^A	9.53	156.76 ^B	11.46
	Tough	198.90 ^A	9.53	149.76 ^B	11.46
HSP 70	Tender	21.40 ^A	1.87	31.55 ^B	1.75
	Tough	25.72 ^A	1.87	27.84 ^A	1.75