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C.L.F. Katiyatiya, G. Bradley, V. Muchenje

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Thermotolerance, health profile and cellular expression of HSP90AB1 in Nguni and Boran cows raised on natural pastures under tropical conditions

C.L.F Katiyatiya[a], G. Bradley[b], V. Muchenje[a,*]

[a]Department of Livestock and Pasture Science, University of Fort Hare, Private Bag X1314, Alice 5700, Republic of South Africa

[b]Department of Biochemistry and Microbiology, University of Fort Hare, Private Bag X1314, Alice 5700, Republic of South Africa

vmuchenje@ufh.ac.za

vmuchenje@hotmail.com

[*]Corresponding author: Tel: +27 40 602 2059; Fax: +27 86 628 2967

Abstract

Boran (n = 15) and Nguni (n = 15) cows were used in a study to determine the effect of breed, age and coat colour on the concentration of heat shock protein 90 (HSP90AB1), physiological rectal and skin temperature, and markers of health. The cows were exposed to summer heat stress and Boran cows had higher significant (P<0.05) skin temperature (35.1±0.42 ˚C) as compared to the Nguni cows (36.0±0.38 ˚C). Nguni cows had higher body thermal gradients than the Boran cows. Boran cows had thicker skin (P<0.05) and longer hairs (24.3±2.26 mm) than their Nguni counterparts (20.2±2.00 mm). The HSP90AB1 concentration was increased in Boran cows, although breed had no significant (P>0.05) influence. Significantly (P<0.05) high urea and total cholesterol was recorded in Boran cows. Coat colour had a significant (P<0.05) effect on the weight and rectal temperature of the study animals. Coat colour and age had no significant effect (P>0.05) on the concentration of HSP90AB1, although older cows (≥9 years) had higher concentrations (5.4±1.29 ng/ml). Age had a significant (P<0.05) effect on packed cell volume, neutrophil/lymphocyte, urea, total protein and gamma-glutamyl transferase whereas cows with ≥9 years had more concentrations than young ones. Age significantly (P<0.05) influenced hair length, skin