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Physiological Response of Water-Restricted Xhosa Goats Supplemented with Vitamin C

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Abstract : The sustainability of livestock production is under threat as a result of water scarcity, fluctuating precipitation, and high environmental temperature. These combined stressors have impacted negatively on general animal production and welfare, necessitating a very reliable and cost-effective management practices, especially in arid and water-limited regions of the world. Instead of the above, this study was designed to investigate the growth performance and physiological response of water-restricted Xhosa ear-lobe goats fed diets supplemented with single or multiple vitamin C (VC) during summer. The total forty-eight goats used for the experiment were balanced for body weight and randomly assigned to the seven treatment groups (seven goats/treatment): GI (W100%); GII (W70%); GIII (W50%); GIV (W70%+3g/day VC); GV ((W50% +3g/day VC); GVI (W70%+3g/d VC+extra 5g on every eight-day); GVII (W50%+3g/d VC+extra 5g on every eight-day). The design was a complete randomized design and VC was administered per os. At the end of the 75-day feeding trial, GIII (W50%) animals were the most affected ($P<0.05$) and the effect was more pronounced in their body condition scores (BCs). Weight loss and depression in feed intake due to water restriction ($P<0.05$) were attenuated by VC treated groups (GIV-GVII). Changes in body thermal gradient (BTG) and rectal temperature (RcT) were similar ($P>0.05$) across the various experimental groups. The attenuation effect of VC was significant in responses to respiratory rate (RR) and cortisol. Supplementation of VC (either single or multiple) did not significantly ($P>0.05$) improve water restriction effect on body condition scores (BCs) and FAMACHA©. The current study found out that Xhosa ear lobe goats can adapt to the prevailing bioclimatic changes and limited water intake. However, supplementation of vitamin C can be beneficial at modulating these stressful stimuli. Continuous consistencies in the outcome of vitamin C on water-stressed animals can help validate recommendations especially to farmers in the arid and water-limited regions across the globe.

Keywords : vitamin C, Xhosa ear-lobe, thermotolerance, water stress
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