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Differential thermotolerance and gene expression in Vechur, Kasargode and crossbred cattle during heat stress

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Global warming and climate change are imminent threat to livestock production. The present study was designed with the objective of evaluation of the expression levels of HSP 70 and ATP1A1 genes following different levels of heat stress in Vechur, Kasargode (both thermotolerant) and crossbred cattle (thermosensitive). Six adult animals each of Vechur, Kasargode and crossbred cattle were selected and gene expression was studied using quantitative real time PCR (Q-RTPCR). The between breed fold increase of HSP 70 expression at 8.00 a.m were 0.18, 0.79 and 4.4 while at 10.00 a.m were 0.08, 1.72 and 22.58 in Kasargode and Vechur, crossbred and Vechur and crossbred and Kasargode, respectively. But at the end of the experiment at 12.00 noon it increased to 0.67, 17.23 and 25.67. In Kasargode and Vechur, crossbred and Vechur and crossbred and Kasargode animals the between breed fold increase in ATP1A1 expression at 8.00 a.m were 0.22, 1.43 and 6.42, while at 10.00 a.m were 0.22, 1.89 and 8.63, respectively. At the end of the experiment the expression levels were 0.13, 2.18 and 16.78 in Kasargode and Vechur, crossbred and Vechur and crossbred and Kasargode animals. The results of the present study suggest that Vechur and Kasargode cattle have superior thermotolerance as compared to crossbred cattle and for crossbreds the ability to acclimate is limited as they have maximized their transcriptomic safety factors, which do not allow for further adjustments to even current changes in climate. The results are important for within and between breed selections and are most indicated for the use in animal breeding programmes in hot and humid tropical conditions.

Biography

Muhammed E M has completed his PhD in Animal Breeding, Genetics and Biostatistics from Kerala Veterinary and Animal Sciences University and done part of his doctoral research work at University of Western Australia, Perth, Australia. He is the District Epidemiologist at Wayanad district under the Department of Animal Husbandry, Government of Kerala. He has published articles in reputed journals and is the recipient of prestigious Crawford fellowship from Australia.

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