

Milk Protein Genetic Variation and Haplotype Structure in Sudanese Indigenous Dairy Zebu Cattle

Authors : Ammar Said Ahmed, M. Reissmann, R. Bortfeldt, G. A. Brockmann

Abstract : Milk protein genetic variants are of interest for characterizing domesticated mammalian species and breeds, and for studying associations with economic traits. The aim of this work was to analyze milk protein genetic variation in the Sudanese native cattle breeds, which have been gradually declining in numbers over the last years due to the breed substitution, and indiscriminate crossbreeding. The genetic variation at three milk protein genes α S1-casein (CSN1S1), α S2-casein (CSN1S2) and κ -casein (CSN3) was investigated in 250 animals belonging to five *Bos indicus* cattle breeds of Sudan (Butana, Kenana, White-nile, Erashy and Elgash). Allele specific primers were designed for five SNPs determine the CSN1S1 variants B and C, the CSN1S2 variants A and B, the CSN3 variants A, B and H. Allele, haplotype frequencies and genetic distances (D) were calculated and the phylogenetic tree was constructed. All breeds were found to be polymorphic for the studied genes. The CSN1S1*C variant was found very frequently (>0.63) in all analyzed breeds with highest frequency (0.82) in White-nile cattle. The CSN1S2*A variant (0.77) and CSN3*A variant (0.79) had highest frequency in Kenana cattle. Eleven haplotypes in casein gene cluster were inferred. Six of all haplotypes occurred in all breeds with remarkably different frequencies. The estimated D ranged from 0.004 to 0.049. The most distant breeds were White-nile and Kenana (D 0.0479). The results presented contribute to the genetic knowledge of indigenous cattle and can be used for proper definition and classification of the Sudanese cattle breeds as well as breeding, utilization, and potential development of conservation strategies for local breeds.

Keywords : milk protein, genetic variation, casein haplotype, *Bos indicus*

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