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Genetic Variation of Beta-Casein Gene in Sudanese Indigenous Cattle

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Abstract

Sudanese indigenous cattle are part of East African *Bos indicus* cattle, have been gradually declining in numbers over the last years due to breed substitution, and crossbreeding. Therefore, conservation and improvement strategies are required to maintain these breeds, which are well adapted to the local environment. The aim of this work was to analyse milk protein genetic variation in the Sudanese indigenous cattle breeds.

The genetic variation at Beta-casein gene (CSN₂) was investigated in 220 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 CSN₂ variants A1, A2, B, I, J and L. Allele frequency, mean effective number of alleles and the magnitude of genetic divergence between populations as Nei's genetic distance (D) were calculated and the phylogenetic tree was constructed.

All breeds were found to be polymorphic for the studied gene. The CSN₂*A2 variant was found very frequently (>0.53) in all analysed breeds with highest frequency (0.77) in Kenana cattle. The second most frequent CSN₂ variant was CSN₂*L (0.12 to 0.22) followed by CSN₂*A1 (0.04 to 0.23). The mean absolute number of alleles was varied between breeds. The mean effective number of alleles per breed was similar for all breeds. The estimated D ranged from 0.003 to 0.023. The most distant breeds were Kenana and Elgash cattle (D 0.023). 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, utilisation, and potential development of conservation strategies for these breeds.

Keywords: Beta casein, *Bos indicus*, cattle, milk protein genes