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Genetic Variation of the Alpha-Lactalbumin Gene in Sudanese Goat Breeds

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Abstract

The gradual disappearance of Sudanese indigenous goat breeds in numbers over the last years is due to the displacement by other breeds, cross-breeding with exotic breeds or with other indigenous breeds. To prevent the irreversible loss of Sudanese indigenous goat breeds which are well adapted to the local environment, breeding improvement and conservation strategies for these breeds should be based on a combination of phenotypic and genetic characteristics. Therefore, milk protein genetic variations are useful functional markers for characterising breeds. The objective of this study was to assess the allelic variation of alpha-lactalbumin (LALBA) gene of Sudanese goat breeds including Nubian, Desert, Taggar and Nilotic goat breeds. The α-lactalbumin is a subunit of lactose-synthase, an enzyme responsible for lactose production, a disaccharide that influences milk production.

Twenty Sudanese goats (five animals per breed) were sequenced for all exons and flanking intronic sequences of the LALBA gene. The obtained sequences were compared with the *Capra hircus* reference sequence at National Center for Biotechnology Information (NCBI): NC_022297.1. We identified seventeen single nucleotide polymorphisms (SNPs) in Sudanese goat breeds compared to the reference sequence at NCBI. Among these SNPs seven in the promoter region, six synonymous, three in the 3 prime UTR and one intronic SNPs. In this study, four SNPS were novel, three synonymous SNPs in Exon 2 (A>G) and one SNP in intron 2 (A>C). Identification of different variants in the LALBA gene can be used for the improvement and conservation of Sudanese local goat breeds. However, more research will be required to assess the functional effects of the genetic variation and association with milk production traits.

Keywords: Alpha lactalbumin gene, milk protein genes, Sudanese goat

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