

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



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Introduction

The goat alpha-lactalbumin a calcium metalloprotein encoded by aplha lactalbumin (LALBA) gene is one of the two major whey proteins in milk.

- Alpha-lactalbumin plays a key role in lactose synthesis in the mammary glands of domestic animals.
- LALBA gene located on chromosome 5 in goat genome and consists of 4 exons coding for the 123 amino acids

The Sudanese goat native breeds is well adapted to survive and reproduce under the local harsh environments.

• Native Breeds declined in number over the past years due to displacement by exotic breeds and cross breeding.

The conservation of indigenous breeds and improvement strategies are required to maintain this breed.

polypeptide chain.

- Objective

The aim of this study is to assess the allelic variation of the main milk protein genes characterizing goat in Sudan, which might be necessary for breed improvement and conservation decision.

- Material and Methods

Animals and samples

Blood samples for DNA extraction were collected from 20 unrelated individuals from four Sudanese goat breeds (Nubian, Desert, Taggar and Nilotic) from areas shown in Figure 1.

Genotyping

 Sequencing the promoter and coding regions of LALBA gene for five animals per breed (20 animals).
 Data analysis



The obtained sequences were cleaned and trimmed using BioEdit Sequence Alignment Editor.

- Multiple alignment with the reference sequence using DNA Baser v3 and Clustal Omega.
- Allele and genotype frequencies were estimated based on the genotype counting method.

- Results

Figure 1: Sample location of Sudanese goat

- Seventeen SNPs were identified in the Sudanese goat breeds compared with the Capra hircus goat reference sequence at NCBI.
- Among these SNPs seven in the promoter region (Figure 2A), six synonymous, three in the 3 prime UTR (Figure 2B) and one intronic SNPs.
- Four SNPs were novel, three synonymous SNPs in Exon 2 (A/G) and one in intron 2 (A/C) (Figure 2C).



Figure 2: Allele frequency of the genetic variants in the promoter region (A), coding region (B) and novel SNP (C) of *LALBA* gene in Sudanese goat breeds.

Conclusion

High content of polymorphism *in LALBA* gene in Sudanese goat breeds.
The variability of the LALBA provides a resource for the improvement, utilization and conservation of the local breed.

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