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Genetic Variation of Lactoferrin Gene and Its Association with Productive Traits in Egyptian Goats

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Abstract : Lactoferrin (LF) is a multifunctional protein involved in economically production traits like milk protein composition and skeletal structure in small ruminants including sheep and goat. So, LF gene - with its genetic polymorphisms associated with production traits - is considered a candidate genetic marker used in marker-assisted selection in goats. This study aimed to identify the different alleles and genotypes of this gene in three Egyptian goat breeds using PCR-SSCP (polymerase chain reaction-single-strand conformation polymorphism) and DNA sequencing. Genomic DNA was extracted from 120 animals belonging to Barki, Zaraibi, and Damascus goat breeds. Using specific primers, PCR amplified 247-bp fragments from exon 2 of LF goat gene. The PCR products were subjected to Single-Strand Conformation Polymorphism (SSCP) technique. The results showed the presence of two genotypes GG and AG in the tested animals. The frequencies of both genotypes varied among the three tested breeds with the highest frequencies of GG genotype in all tested goat breeds. The sequence analysis of PCR products representing these two detected genotypes declared the presence of an SNP (single nucleotide polymorphisms) substitution (G/A) among G and A alleles of this gene. The association between different LF genotypes and milk composition as well as body measurement was estimated. The comparison showed that the animals possess AG genotypes are superior over those with GG genotypes for different parameters of milk protein compositions and skeletal structures. This finding declared that allele A of LF gene is considered the promising marker for the productive traits in goat. In conclusion, the Egyptian goat breeds will be needed to enhance their milk protein composition and growth trait parameters through the increasing of allele A frequency in their herds depending on the superior production traits of this allele in goats.

Keywords : lLactoferrin gene, PCR-SSCP, SNPs, Egyptian goat
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