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Poster Abstract – C.69

GENETIC POLYMORPHISM AT CSN1S1 LOCUS IN TWO CZECH GOAT BREEDS

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White Short-Haired (WSH) and Brown Short-Haired (BSH) are two protected local goat dairy breeds from the Czech Republic. A genetic characterisation of these breeds is needed to allow the preservation and the exploitation of their genetic variability. For this purpose a research project was started with the aim to investigate the genetic structure of the casein gene cluster and to evaluate the haplotype variability among and within populations. In this work we present the first results of this research. The goat CSN1S1 gene represents an excellent model for demonstrating that the major part of the variability observed in the CSN1S1 casein content in the goat milk is due to the presence of autosomal alleles at single structural locus CSN1S1. Genetic polymorphism at the CSN1S1 locus gene is characterized by different alleles which are results of mutation from single substitution, insertion/deletion, interallelic recombination or apparent lack of synthesis of alphas1-casein. So far, this locus is characterized by at least 17 alleles, associated to four different levels of alphas1-casein expression in milk. Alleles A, B, C, H, L and M are associated to a high content alphas1-casein, alleles I and E to an medium content and alleles D, F and G to a low level of alphas1-casein in the milk. Alleles CSN1S1 0_1, 0_2 and N are "null" alleles and have been associated with the absence of alphas1-casein. DNA samples obtained from a total of 498 animals belonging to White Short-Haired (317) and Brown Short-Haired (181), randomly chosen in the flock, were analysed at the CSN1S1 locus. In order to detect carriers of alleles related to a different level of the corresponding milk proteins, DNA samples obtained from a total of 498 animals belonging to White Short-Haired (317) and Brown Short-Haired (181), randomly chosen in the flock, were analysed at the CSN1S1 locus. Genomic analysis was performed by using different molecular techniques (PCR, PCR-RFLP and AS-PCR). Analysis of CSN1S1 locus showed, in both breeds, (WSH and BSH) the prevalence of allele F (0.75; 0.69) which is related to a low level of the protein in the milk. The alleles related with a "high" level of protein synthesis in goat milk are present with a frequency of 0.20 and 0.21, respectively. The null and E alleles were identified with very low frequencies in both breeds. The comparison of these results with those available in the literature showed a similarity with alpine breed characterized by high frequency of allele F. However in alpine breed the E allele is present with a high frequency. Obtained results presented contribute to a better knowledge of the genetic variation at CSN1S1 casein gene in goat breed as gene reserve pool in Czech Republic. Furthermore these first data can be used to monitor the genetic structure of the two breeds to avoid further loss of genetic variability. The research is now extended to the other three casein loci with the aim to study the effects of casein haplotype, instead of individual genotype, on milk production and cheese -making properties of goat milk.

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