

Application of molecular genetic markers for genetic resource estimation in cattles in Ukraine

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Introduction: The unique Charolais herd of Ukrainian selection was begun from 1970 by cross breeding with Gray Ukrainian cattle breed. Such hybrids have better reproductive abilities with maintaining of high meat quality. Now, the problem of native and local farm animal breeds estimation and conservation must be solved by the whole complex of current DNA analysis methods. Genomic selection methods based on a Single Nucleotide Polymorphisms (SNPs) analysis is a widely used powerful new tool in an animal breeding program, especially some economically valuable traits genes identification (e.g. growth hormone and milk proteins genes (caseins and whey proteins) in addition and with the microsatellites markers investigated for individual identification and paternity testing, but only a few studies have explored their practical applications for meat production at the breed level.

Objective: To apply microsatellites markers for meat production at the breed level.

Methodology: DNA was isolated from the blood of animals by Kawasaki method. Polymorphism of microsatellite loci was estimated based on 10 markers panel, recommended by ISAG, using standard reagents Bovine PCR Typing Kit II by the capillary electrophoresis analysis on ABI PRISM 3110. The Growth Hormone (GH) and kappa-Casein (CSN3) gene polymorphism were identify by PCR-RFLP with the specific restriction ferments (AluI and HindII, respectively) in a 2% agarose gel.

Results: 77 allelic variants of the microsatellite DNA markers were identified, the largest number of the alleles was observed for TGLA53 locus (12 alleles). All microsatellites, besides ETH10, showed a high polymorphism level. Sufficiently high B allele frequency (0,269) of kappa-casein gene was detected and a large number of animals (50.8%) have the heterozygous AB genotype variant. Insignificant advantage of V allele (0,511) frequency over L allele (0,489) of growth hormone gene was identified. Animals with heterozygous LV genotype prevailed (53.7%), frequencies of homozygous LL and VV genotypes were 0.221 and 0.242 respectively.

Discussion: Results of this study will enhance meat production in the country.