

EFFECT OF MILK PROTEIN GENETIC POLYMORPHISM ON MILK YIELD AND COMPOSITION IN LITHUANIAN DAIRY CATTLE POPULATION

Nijolė Pečiulaitienė, Iona Miceikienė, Sigita Kerzienė

Lietuvos veterinarijos akademija, Gyvūnų veisimo ir genetikos katedra, K. Janušausko gyvūnų genetikos laboratorija, Tilžės g. 18, Kaunas LT–47181; tel.36 36 64; el. paštas: nijole@lva.lt

Summary. Milk yield, composition and manufacturing properties are related to milk protein polymorphism genetic variants of bovine milk proteins AlfaS1-casein, Kappa-casein and Beta- lactoglobulin. Three hundred ninety four blood samples of Lithuanian dairy breeds of unrelated cows were investigated (109 LWB, 168 LR, 68 LLG ir 49 LBW). Milk protein genes were identified by polymerase chain reaction (PCR) and RFLP method. It was assessed that BB genotype of milk protein Kappa-casein locus affected major milk fat (4.50 ± 0.5 %) and protein (3.47 ± 0.04 %) averages; whereas Kappa- casein BE genotype could be characterized by higher milk yield average (5776 ± 27 kg). The whey protein BB genotype of Beta-laktoglobulin locus had influenced major milk fat ($4.67\pm 0.01\%$) average. Alfa_{s1}-casein BB genotype affected higher milk yield average (5242 ± 14 kg), whereas Alfa_{s1}-casein CC genotype was superior in protein average (3.64 ± 0.09 %). In our study statistically higher influence of Kappa-casein gene was estimated for milk protein percentage (5.9%, $P<0.001$). AlfaS1- Kappa haplotypes were associated with the highest protein percentage (2.2%, $P<0.001$) and lowest fat, kg (0.4%, $P<0.001$) in bovine milk. Further, in studied Lithuanian dairy cattle population milk protein AlfaS1- Kappa casein haplotypes, BC haplotypes had highest effect on average milk protein percentage and AB haplotype was associated with average milk yield, kg.

The identification of milk protein genes could be an economically important selection criteria for dairy herds designated for industrial milk production. Moreover, milk protein polymorphism can be used as selection criteria and informative molecular markers for yield, composition and technological properties of milk in cattle selection programs.

Keywords: casein, lactoalbumin, lactoglobulin, milk, polymerase chain reaction, cattle.