

Genetic polymorphism of milk proteins: relationship with milk compositional traits in Indian goat breeds

Ajoy Mandal and P. K. Rout

Central Institute for Research on Goats, India

Milk samples of Jakhrana(70) and Sirohi (22) goat breeds, maintained at the Central Institute for Research on Goats, Makhdoom, Mathura, Uttar Pradesh, India, were analyzed to study the genetic polymorphisms of milk proteins and its effect on milk compositional traits. The genetic variants in milk samples were detected by sodium dodecyl sulphate polyacrylamide gel electrophoresis (SDS-PAGE) method. The different milk compositional traits (viz. casein, total protein, fat, total solid, and solid-not-fat content in milk) were estimated by using standard protocol. The electrophoretic pattern revealed that milk sample of both the breeds contained four major casein variants, i.e., α_{s1} -casein, α_{s2} -casein, β -Cn, and κ -Cn and two whey proteins i.e., β -lactoglobulin and α -lactalbumin. Further α_{s1} -casein locus showed 2 variants such as A and F with a frequency of 0.843 and 0.157, respectively in Jakhrana goat, whereas three variants of α_{s1} -casein viz., A, B and F, were observed in Sirohi goat, having the allelic frequencies of 0.636, 0.296 and 0.068, respectively. No polymorphic pattern was observed at α_{s2} -, β -, κ -casein locus and β -lactoglobulin whey protein locus in Jakhrana breed. However, the electrophoretic pattern of α -lactalbumin variant also showed two allelic forms i.e., A and B with frequencies of 0.97 and 0.03, respectively in Jakhrana breed. In Sirohi breed, two variants viz. A and B with gene frequencies 0.77 and 0.23 respectively were observed at α_{s2} -casein locus, but no polymorphism exists at β -casein, κ -casein, β -lactoglobulin and α -lactalbumin locus. The study also revealed that milk protein variants had no significant ($P>0.05$) effect on all milk compositional traits in both Jakhrana and Sirohi breeds.

Biography

Ajoy Mandal has completed his Ph.D in Animal Genetics and Breeding from National Dairy Research Institute, Karnal, Haryana, India and obtained his postdoctoral training from INRA, France in the year 2006. Presently, he is working as senior research scientist in Animal Breeding Section at ERS-NDRI, Kalyani, Nadia, West Bengal, India. He is primarily involved in the research with large ruminants, which deals with use of theory and computer analysis of data for genetic evaluation of animal. Earlier he worked on genetic evaluation of production and reproduction traits of goat and sheep at Central Institute for Research on Goats, Makhdoom, Mathura, Uttar Pradesh, India. He has also been engaged in the study of disease resistance of these species and molecular characterization of goat genetic resources.

ajoymandal@rediffmail.com