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## **Molecular characterization of candidate genes affecting milk production traits in Leh cattle adapted to high altitude**

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The characterization of candidate genes influencing traits of economic importance are of paramount importance for understanding the molecular basis of performance traits in different livestock breeds. To date, several class I polymorphisms have also been reported in different Indian native as well as exotic cattle breeds, but their status (gene frequencies, gene diversity, differences between breeds) is still unknown in Leh cattle- one of the important Indian native cattle adapted to high altitude conditions. This local breed might possess unique alleles or combinations of alleles that are different from other indigenous and exotic cattle breeds. Analysis of candidate genes thus becomes an important step in strategies for trait specific gene characterization. The present study was therefore, undertaken to delineate the genetic polymorphism in several candidate loci affecting milk production and composition including beta-casein ( $\beta$ -CN), kappa-casein ( $\kappa$ -CN), alpha-lactoglobulin ( $\alpha$ -LA), beta-lactoglobulin ( $\beta$ -LG), bovine growth hormone (bGH), Pituitary transcription factor (Pit-1), prolactin (PRL), diacylglycerol acyltransferase (DGAT 1) and butyrophilin 1,3 (BTN1, 3) for functional traits across 72 animals of Leh cattle using PCR-RFLP (PCR-Restriction fragment length polymorphism) technique. The observed allelic profile indicated that allelic frequency pattern in Leh cattle was similar to other studied Indian native cattle breeds as compared to taurine cattle breeds. Hence Leh cattle maintain the indicine characteristics at most of the studied loci (e.g., A allele at Kappa-Casein; MspI-allele at Bovine growth hormone, K allele at DGAT I, A2 allele at Beta-Casein, A allele at Butyrophilin, 1, 3). In addition, new allelic variants were also observed at Kappa-Casein and Butyrophilin-3 loci which are novel to Leh cattle and have not been observed in Indian native or exotic cattle. Further, the predominance of A2 allele at beta casein loci strongly suggested that milk from Leh cattle is A2 milk that is considered safe for human consumption. The acrocentric position of Y chromosome analyzed in 3 male animals indicated Leh local cattle to be of indicine origin. Overall, the data revealed that Leh cattle is of Zebu type and the allelic profile of Leh cattle at most of the studies loci is similar to other Indian cattle breeds along with new/novel alleles specific to Leh cattle.

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