



## Molecular characterization, polymorphism of the ACOX1 gene and association with ultrasound traits in *Bos taurus*

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Genet. Mol. Res. 10 (3): 1948-1957 (2011)

Received August 24, 2010

Accepted February 28, 2011

Published September 9, 2011

DOI <http://dx.doi.org/10.4238/vol10-3gmr1036>

**ABSTRACT.** Acyl-coenzyme A oxidase 1 (ACOX1) is the first enzyme in peroxisomal fatty acid  $\beta$ -oxidation; it is rate-limiting and plays a key role in fatty acid metabolism and fat deposition. ACOX1 is an important candidate gene for meat quality selection through marker-assisted selection. Genomic structural analysis showed that bovine ACOX1 shares 86% identity with human ACOX1. Using PCR-SSCP technology, we discovered a single nucleotide polymorphism (SNP) (A1865C) in exon 13 of the ACOX1 gene. Allele frequencies of this SNP were investigated and evaluated with the  $\chi^2$  test in 641 cattle populations; only the Jiaxian red population was not in Hardy-Weinberg equilibrium. Gene heterozygosity, effective allele numbers and polymorphism information content of the bovine ACOX1 locus in seven populations varied from 0.2778 to 0.4954, 1.3846 to 1.9817 and 0.2392 to 0.3727, respectively. We also looked for a potential association of this SNP with ultrasound traits in 327 individuals and found a significant effect on ultrasound backfat thickness and ultrasound marbling score ( $P < 0.05$ ). Meat quality traits were analyzed in another 71 Qinchuan individuals to determine associations with genotype.

Animals with genotype AA had higher mean values of backfat thickness than those with genotypes AC and CC. A represents the base before mutation and C represents the base after mutation. We conclude that this SNP of the ACOX1 gene has potential as a genetic marker for meat quality traits in cattle reproduction and breeding.

**Key words:** Cattle; ACOX1 gene; SNP; PCR-SSCP; Ultrasound traits