Tropentag, October 7-9, 2008, Hohenheim

"Competition for Resources in a Changing World:
New Drive for Rural Development"

Identification of Single Nucleotide Polymorphism on MC1R Gene in Thai Native Cattle

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Abstract

Melanocortin receptor 1 (MC1R) gene is an important gene in the regulation of pigment synthesis and responsible for coat colour in mammals. The polymorphism of MC1R gene in *Bos taurus* has been characterised as four alleles (ED, E+, E1 and e). In this study was carried out to identify single nucleotide polymorphism (SNP) of MC1R gene in Thai native cattle (*Bos indicus*). The coding region of MC1R gene in Thai native cattle namely White Lamphun cattle (white coat colour) was sequenced and compared with Holstein and Charolais breeds. The MC1R sequence of White Lamphun cattle has high homology with the *Bos taurus* (99 % identity). Four polymorphic sites were found in MC1R gene of the White Lamphun at position 296, 416, 663 and 725 bp of open reading frame. Out of these, three SNPs were identified as missense mutation, consisting of **(1)** a single base substitution (T296C) resulting in an amino acid change from leucine to proline (E+ allele) **(2)** a single base substitution (C416T) leading to an amino acid change from alanine to valine and **(3)** a single base substitution (A725C) leading to an amino acid change from asparagine to threonine. Moreover, a non-synonymous mutation was located at position A663C of bovine MC1R coding region. Based on this observation, two novel SNPs at postion 416 and 663) were found only White Lamphun cattle breed. This result indicated that the MC1R gene of White Lamphun cattle breed was E+ allele and these two novel SNPs may be used as allele specific markers for the White Lamphun cattle breed.

Keywords: Marker, Thai native cattle, White Lamphun cattle

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