

INTISARI

IDENTIFIKASI *SINGLE NUCLEOTIDE POLYMORPHISMS* GEN *MC1R* PADA KAMBING PERANAKAN ETTAWA DENGAN FENOTIP BERKEPALA HITAM DAN COKELAT

Ahizta Pramesthi Jadmiko
22/503307/KH/11341

Kambing Peranakan Ettawa (PE) merupakan kambing lokal Indonesia hasil persilangan kambing Jamnapari dengan kambing Kacang yang dikenal sebagai ternak dwiguna dan ternak kesayangan yang sering diikutsertakan dalam kontes. Kambing PE terbagi menjadi dua kelompok utama yaitu kepala hitam dan kepala cokelat. Perbedaan warna ini dipengaruhi oleh gen *Melanocortin 1 Receptor* (MC1R) yang merupakan gen pengkode pigmentasi. Penelitian ini bertujuan untuk mengidentifikasi *Single Nucleotide Polymorphisms* (SNPs) gen *MC1R* pada kambing PE kepala hitam dan kepala cokelat. DNA diisolasi dari enam sampel darah kambing PE (HITAM1, HITAM2, HITAM3, COKELAT1, COKELAT2, dan COKELAT3). Primer yang digunakan terdiri dari primer *forward* (5'-GAGAGCAAGCACCCCTTTC-3') dan primer *reverse* (5'-AGTGGGTCTCTGGATGGA-3'). Sekuensing dilakukan pada hasil PCR keenam sampel menggunakan metode Sanger yang kemudian dianalisa menggunakan perangkat lunak MEGA 12. Analisa hasil *alignment* keenam sampel dilakukan pada sekuen nukleotida dan asam amino dengan menggunakan perbandingan gen referensi kambing berfenotipe putih. Variasi sekuen gen *MC1R* ditemukan pada situs nukleotida 183, 676, 719, 749, dan 802. Variasi pada situs 183 dan 676 merupakan mutasi transisi, variasi situs 749 dan 802 merupakan mutasi transversi, sedangkan variasi situs 719 merupakan mutasi insersi. Dampak variasi tersebut pada perubahan asam amino berupa *silent mutation* pada asam amino ke-61, *missense mutation* pada asam amino ke-226, 250, dan 268, serta *frameshift mutation* pada asam amino ke-240. Hasil penelitian menunjukkan variasi SNP pada gen *MC1R* ditemukan pada kambing PE berkepala hitam dan cokelat setelah dibandingkan dengan sekuens kambing berfenotipe putih. Variasi tersebut mengindikasikan bahwa gen *MC1R* berkaitan dengan variasi warna rambut pada kambing PE.

Kata kunci: kambing Peranakan Ettawa, kepala hitam, kepala cokelat, *Melanocortin 1 Receptor* (MC1R), SNP

ABSTRACT

IDENTIFICATION OF SINGLE NUCLEOTIDE POLYMORPHISMS IN THE *MC1R* GENE IN PERANAKAN ETTAWA GOATS WITH BLACK-HEADED AND BROWN-HEADED PHENOTYPES

Ahizta Pramesthi Jadmiko

22/503307/KH/11341

Peranakan Ettawa (PE) goat is a local Indonesian breed resulting from the crossbreeding of the Jamnapari goat with the Kacang goat; it is known as a dual-purpose livestock animal and a pet that is often entered into contests. PE goats are divided into two main groups: black-headed and brown-headed. This color difference is influenced by the Melanocortin 1 Receptor (*MC1R*) gene, which encodes pigmentation. This study aimed to identify Single Nucleotide Polymorphisms (SNPs) in the *MC1R* gene in black-headed and brown-headed PE goats. DNA was isolated from six PE goat blood samples (BLACK1, BLACK2, BLACK3, BROWN1, BROWN2, and BROWN3). The primers used consisted of a forward primer (5'-GAGAGCAAGCACCTTTC-3') and a reverse primer (5'-AGTGGGTCTCTGGATGGA-3'). Sequencing was performed on the PCR products of the six samples using the Sanger method, which were then analyzed using MEGA 12 software. Analysis of the alignment results for the six samples was performed on the nucleotide and amino acid sequences using the white goat reference gene for comparison. Variations in the *MC1R* gene sequence were found at nucleotide positions 183, 676, 719, 749, and 802. The variations at positions 183 and 676 are transition mutations; those at positions 749 and 802 are transversion mutations; and the variation at position 719 is an insertion mutation. The impact of these variations on amino acid changes includes a silent mutation at amino acid 61, missense mutations at amino acids 226, 250, and 268, and a frameshift mutation at amino acid 240. The results of the study show that SNP variations in the *MC1R* gene were found in black-headed and brown-headed PE goats when compared to the sequences of white-phenotyped goats. These variations indicate that the *MC1R* gene is associated with coat color variation in PE goats.

Key words: black-headed, brown-headed, Melanocortin 1 Receptor (*MC1R*), Peranakan Ettawa goats, SNP