

KERAGAMAN GENETIK KAMBING DI INDONESIA BERDASARKAN GEN MELANOCORTIN-4 RECEPTOR

INTISARI

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Gen Melanocortin 4 Receptor (MC4R) merupakan marker gen yang potensial untuk pertumbuhan pada hewan ruminansia dan non-ruminansia. Tujuan dari penelitian ini adalah untuk mengidentifikasi *Single Nucleotide polymorphism* (SNP) dan keragaman gen Melanocortin-4 Receptor (frekuensi genotip, alel dan keseimbangan Hardy-Weinberg) pada kambing-kambing yang ada di Indonesia. Total 197 sampel darah terdiri dari sepuluh bangsa kambing yaitu, Boer, Kacang, Boerka, Peranakan Ettawa, Boerawa, Muara, Kosta, Senduro, Samosir dan Gembrong telah dikoleksi dan diisolasi DNA-nya. Sepasang primer digunakan untuk amplifikasi DNA gen MC4R (F: 5'-TCGGGCGTCTTGTTTCATCAT -'3 dan R: 3'- CAAGACTGGGCACTGCTTCA -'5) menggunakan metode PCR (*Polymerase Chain Reaction*). Empat SNP yaitu SNP g.998 A/G, g.1079 C/T, g.1151 C/T dan g.1292 C/A teridentifikasi dengan menggunakan metode sekuensing DNA. Penentuan genotip berdasarkan SNP (Single Nucleotide Polymorphism) g.1079 C/T dilakukan dengan menggunakan enzim restriksi Kpn1 dengan metode PCR-RFLP. Tiga tipe genotip (CC, CT dan TT) dimiliki oleh kambing Gembrong, Kosta, Kacang, dan Boerka. Genotip TT tidak ditemukan dikambing Peranakan Ettawa, Muara, Boer, Senduro, dan Boerawa. Secara keseluruhan, frekuensi genotip CC (45%, n= 89) lebih tinggi daripada frekuensi genotip CT (36%, n=71%) dan TT (19%, n= 37). Hasil dari rata-rata frekuensi alel dari semua bangsa kambing, nilai frekuensi alel C (0,68) lebih tinggi daripada alel T (0,32). Analisa keseimbangan Hardy Weinberg menunjukkan salah satu populasi sampel terjadi penyimpangan, yaitu pada kambing Kosta ($X^2 > 5,99$). Berdasarkan hasil tersebut dapat disimpulkan gen MC4R pada kambing bersifat polimorfik dan SNP g.1079 C/T perlu dilakukan penelitian lebih lanjut terkait dengan asosiasi gen terkait dengan sifat pertumbuhannya pada kambing.

Kata kunci: Kambing Lokal, SNP, Gen MC4R

GENETIC DIVERSITY OF GOAT IN INDONESIAN BASED ON MELANOCORTIN 4 RECEPTOR GENE

ABSTRACT

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The Melanocortin 4 Receptor (MC4R) gene have been known as a potential gene marker for growth in ruminants and non-ruminants. The purpose of this study was to identify *Single Nucleotide polymorphism* (SNP) and the diversity of the Melanocortin-4 Receptor gene in goats in Indonesia. A total of 197 blood samples consisted of ten goat breeds (Boerka, Muara, Kosta, Gembrong, Samosir, PE, Boerawa, Boer, Kacang, Senduro) that had their DNA isolated. A pair of primers was used for DNA amplification of the MC4R gene (F:5'-TCGGGCGTCTTGTTTCATCAT-3' and R:3'-CAAGACTGGGCACTGCTTCA-5') using the PCR method. Four SNPs g.998 A/G, g.1079 C/T, g.1151 C/T, g. 1292 C/A were identified using the DNA sequencing method. The PCR-RFLP method was used for the genotype detection based on SNP g.1079 C/T using the Kpn1 restriction enzyme. The C allele frequency (0.68) was higher than the T allele frequency (0.68) in all goat breeds studied. Three types of genotypes (CC, CT and TT) were found in Gembrong, Kosta, Kacang, and Boerka goats. However, The TT genotype was not found in PE, Muara, Boer, Senduro, and Boerawa goats. Overall, the CC genotype frequency (45%, n=89) was higher than the CT (36%, n=71%) and TT (19%, n=37). Hardy Weinberg equilibrium analysis showed that in the sample population of Kosta goat ($X^2 > 5.99$) there was a deviation. Based on these results, it can be concluded that two SNPs g.998 A/G and g.1079 C/T can be used for further research related to gene association related to growth traits in goats. Based on these results, it can be concluded that the MC4R gene in goats is polymorphic and SNP g.1079 C/T needs to be done further research related to the association of genes related to growth trait in goats.

Keyword: Local Goat, SNP, MC4R Gene