

Chicken Major Histocompatibility Complex Genotyping by High Resolution Melting Analysis

Ammar Ramezani¹, Gholamreza Nikbakht Brujeni^{2*}, Nariman Sheikhi³
and Kaveh Parvandar Asadollahi³

¹ PhD Student in Immunology, Department of Pathobiology, Faculty of Veterinary Medicine, Science and Research Branch, Islamic Azad University, Tehran, Iran

² Professor, Department of Microbiology and Immunology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

³ Associate Professor, Department of Clinical Science, Faculty of Veterinary Medicine, Science and Research Branch, Islamic Azad University, Tehran, Iran

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Abstract

The chicken major histocompatibility complex (MHC), known as the B-locus or serological blood group, is responsible for controlling autoimmune and resistance to viral, bacterial, and parasitic diseases. The microsatellite LEI0258, as a reliable marker for avian MHC typing, can be used to determine the identity of different populations and individual or breed characteristics in academic and applied studies. In this study, High Resolution Melting (HRM) analysis was used to determine MHC genotypes based on the LEI0258 microsatellite in Ross 308 broiler chickens. To this end, genotypes were first determined by conventional PCR and electrophoresis methods, as well as fragment analysis, and then the findings were compared and analyzed with the results of the HRM assay. From 100 samples, 5 genotypes were identified in conventional PCR and electrophoresis assays, as well as fragment analysis. These genotypes included alleles with molecular weights of 448, 385, 300, and 207 base pairs. In HRM analysis, normalized fluorescence changes versus temperature (degrees Celsius) were evaluated for five different genotypes. The results showed that the HRM method is capable of discriminating different genotypes as well as homozygous and heterozygous cases. Overall, it seems that the high-resolution melting analysis method can be applied to study the diversity of avian MHC genes. Although this technique cannot precisely identify the alleles of each chromosome, due to the co-dominant nature of MHC genes, the results are acceptable for assessing genetic composition and determining genotypes.

Key words: Chicken, Genotyping, Major Histocompatibility Complex, High Resolution Melting Analysis, Melting Temperature Analysis

* **Corresponding Author:** Gholamreza Nikbakht Brujeni, Professor, Department of Microbiology and Immunology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran
E-mail: nikbakht@ut.ac.ir



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