

Sequencing and single nucleotide mutations for promotor region and heat shock protein 70 (HSP70) gene in Khuzestan native chickens

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Received: 18.06.2018

Accepted: 23.01.2019

Abstract

Heat shock protein 70 (Hsp70) is a chaperone that is expressed in response to stress. The purpose of this study was to determine sequences and single nucleotide promotor mutations and heat shock gene 70 and to investigate the effect of single nucleotide mutations on the three-dimensional structure and thermal shock protein function of Khuzestan native chicken strain using bioinformatics methods. To do this research, 20 native blood samples were taken from different locations of Khuzestan province. After DNA extraction, using several primers, promoter and heat shock protein 70 gene were amplified and sequenced. Three mutations were observed throughout the complete heat shock protein 70 gene. The first mutation in nucleotide position 259 (A259G) was observed, which guanine replaced adenine. The second mutation occurred at the nucleotide position of 277 (C277G), where guanine was replaced by cytosine. The third mutation occurred at the nucleotide position of 1749 (C1749G), where guanine was replaced by cytosine. In the first and second mutations, there is no change in the amino acid, but the mutation at position 1749 causes the serum amino acid to become tryptophan. The mutation occurred at the position of 583 amino acid heat shock protein but did not change the 3D building and its performance. This amino acid change causes more stability in the heat shock protein 70 and maybe one of the reasons for the resistance of the native to the heat.

Keywords: Sequencing, Single nucleotide mutation, Promotor, Heat shock protein 70, Native chicken

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