

The Effect of Different Rearing Conditions on Muscle Characteristics in Broilers of Two Commercial Lines — A Light Microscopic Study

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Abstract :

A comparative histological and morphometric study based on selected skeletal muscles *musculus pectoralis superficialis* and *musculus gastrocnemius* in two lines of meat-type chickens, Anak Titan and Isa 215, was performed to detect potential differences regarding the effect of three production systems (chickens raised indoors in a conventional facility, indoors with limited outdoor access and outdoors with an umbrella roof) on muscle structure. The muscle fiber size was found to be affected by the production system, while the impact of the breeding line was less apparent. Disseminated fiber degeneration occurred more frequently in both examined muscles of Isa chickens raised outdoors. Necrotic fibers were very often infiltrated by mononuclear cells and underwent phagocytosis. The intensity of abnormal changes in muscle structure, including tiny fibers, fibers with hyaline cytoplasm and fibers with central nuclei, was substantially higher in chickens having outdoor access. This trend was particularly noticeable in *musculus pectoralis superficialis* and within the Isa 215 line. This indicates that it is more difficult for chickens of this line to adapt to changing environmental conditions. Significant changes observed in both muscles of birds raised outdoors can be considered highly undesirable with respect to the breeding objectives and breeding strategies for meat-type chickens. Environmental factors were found to play a more important role in chickens of the highly selected Isa 215 line, thus pointing to their worse adaptability to the less stable outdoor conditions. Furthermore, the present results suggest that the indoor housing system with access to an outdoor area can be an alternative to the traditional production system with regard to Anak Titan chickens.

Key Word :

histology, meat-type chickens, muscle, rearing conditions

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