

Heat stress response of broilers housed at two different stocking densities.

I. OLIVAS¹, A. VILLAGRÁ¹, A.G. TORRES² and M. LAINEZ¹

¹Centro de Tecnología Animal CITA-IVIA, Segorbe, Castellón, Spain;

²Universidad Politécnica de Valencia, Valencia, Spain.

E-mail: villagra_ara@gva.es

Heat stress is one of the most important stressors in broiler production, especially in hot regions, such as the Mediterranean area. It can result in an increase of mortality rates and reduction of performance in broilers and laying hens or in reduced welfare of birds. Another major issue in the debate on broiler welfare is stocking density. Very high densities may impair the birds' welfare directly and indirectly. Thus, the objective of this paper was to assess possible differences in the response to an acute heat stress of broilers housed at two different stocking densities (15 and 20 birds/m²). 2898 male and female chickens Ross®xRoss® (50% each) were used in this study, which was carried out in three identical experimental rooms provided with environmental control systems. Each room was divided lengthways into two different parts (pens), with different sizes, and 483 chickens were located in each pen, so that two different stocking densities were achieved. Thermal stress started on day 29 and lasted until day 36, and it consisted of increasing the temperature to 32°C from 10:00 to 14:00 and keeping it at 28°C during the rest of the day. Measured parameters were weight, water consumption, creatine kinase (CK), heterophil lymphocyte ratio (HL) and rectal temperature and the measurements were carried out on days 28 and 37. All data were subjected to ANOVA Analysis with density and thermal treatment as main effects, using the General Linear Models Procedure (proc GLM) of SAS System®. Results showed that stocking density had no significant effect during the thermal treatment on growth and weight but it affected water consumption ($p=0.0081$) being higher at lower density. With regard to physiological stress measures, stocking density had no significant effect on H/L ratio ($p=0.7091$) but the thermal treatment increased it significantly ($p<0.0001$), regardless the stocking density and the same occurred for CK levels. Finally, for rectal temperature, both the thermal treatment itself ($p<0.0001$) and the stocking density ($p<0.0001$) had affected this parameter, and higher values were obtained after the heat stress and in the lower density. In conclusion, present results showed that although the heat stress was achieved, the studied decrease in stocking density did not seem to have beneficial effects when broilers had to cope with it.

Keywords: thermal stress, broiler, stocking density, enzyme activity