

# CHARACTERIZATION OF THE LOAD MICROCLIMATE DURING BROILER CHICKENS TRANSPORT USING THE ENTHALPY COMFORT INDEX

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## RESUMO

In Brazil, due to their climatic attributes and cargo bay models used, broilers are usually subjected to thermal variations that may compromise their thermal comfort and, consequently, their welfare during transport to the slaughterhouse. The aim of this study was to characterize the loading microclimate during broiler transport, using the enthalpy comfort index (ECI). The study was approved by the Ethics Committee on Animal Use of the University of Brasília under opinion No. 130.177/2015. The ECI takes into account the means of temperature and relative humidity recorded using data loggers, as a function of 12 positions determined to study the load microclimate and the local barometric pressure mean (890 mmHg). Overall, 12 shipments were monitored from catching to slaughter during the daytime. Thus, shipments were classified as distance 15 km (Dist15) or distance 90 km (Dist90), considering the routes from farms to the slaughterhouse, during the dry and rainy seasons. Each truck body had 4 rows of crates, measuring 13 crates horizontally and 10 crates vertically and totaling 520 crates (3,640 birds per load). The experiment followed completely randomized design with 48 treatment in a factorial design [2 seasons (rainy and dry) × 2 distances (Dist15 and Dist90) × 12 positions] with 3 replicates per experimental group. The data were subjected to analyses of variance using software SAS with subsequent comparisons of means using Tukey's test (5% significance). The ECIs were categorized into comfort (35.0 to 48.0 kJ/kg), warning (48.1 to 57.6 kJ/kg), critical (57.7 to 66.1 kJ/kg), and lethal (66.2 to 90.6 kJ/kg) zones for broilers beginning at the sixth week of age. The ECI indicates the environmental condition in relation to animal heat stress, and as the ECI increases, comfort decreases. The highest ECI, which was observed during the rainy season for Dist90 shipments ( $70.6 \pm 6.5$  kJ/kg), exceeded the broiler comfort zone and therefore, was considered within the lethal zone. For the same season, the ECI for Dist15 shipments was  $58.1 \pm 9.7$  kJ/kg and thus, categorized in the critical zone. Dist90 during rainy season, and hence higher humidity in the environment, are harmful to broiler thermal comfort. ECI calculated for Dist90 ( $46.9 \pm 4.5$  kJ/kg) during the dry season was within the comfort zone limit. On the other hand, the ECI for Dist15 during dry season ( $50.5 \pm 4.5$  kJ/kg) was categorized in the alert zone. Thus, during this season, longer distances may result in improved broiler welfare compared with short distances. The ECI provided an understanding of the environmental conditions offered to animals during transport for slaughter. However, for better results at the slaughterhouse, other factors, such as the temperature and humidity should be monitored inside the shed during collection and the loading. Moreover, prior knowledge of climatic conditions for the day scheduled for transport may facilitate decision-making concerning the density of broilers per crate as well as the wetting or not of the load. In terms of comfort, the rainy season was the most critical period for broiler transport, resulting in the highest ECI.

**PALAVRAS-CHAVE:** Bioclimatology, microenvironment, poultry, pre-slaughter handling, transport

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