Spatial variation of enthalpy in a commercial broilers housing in a hot climate region

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Abstract

Analysis of the spatial variation of the thermal comfort indexes inside a livestock installation is an important tool for management and handling of the animal production system in the environment. It facilitates decision-making, and helps to plan possible changes in the facility with the aim of increasing animal welfare. When the facilities are located in regions with warm weather and a small temperature amplitude, Brazilian broiler producers usually opt for installations without thermal insulation on the sides so that hybrid negative pressure ventilation can be used. However, the question of spatial temperature variation, thermal comfort indexes and maps of enthalpy inside uninsulated broilers houses remains unanswered for some parts of Brazil. The objective of this work was to analyse the spatial variation of enthalpy as a comfort index in a typical uninsulated commercial broiler house in a hot climate region, Mato Grosso State, in the mid-west of Brazil. Temperature, humidity and luminosity were measured and the enthalpy was calculated for the experimental period. It was observed that the enthalpy index was outside the thermal comfort zone for broilers during the experimental period, with average values ranging from 71.89 to 79.84 $kJ.kg^{-1}$ of dry air. The maps of enthalpy variation inside the broiler house showed that the highest enthalpy values were predominantly on the left side of the building, which can be correlated with solar radiation which was most intense in this area during the experimental period.

Keywords: animal welfare, spatial variation, poultry housing

Introduction

Birds are homoeothermic animals which maintain body temperature variations within constant limits by biochemical, physiological and behavioural processes.