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Effect of seasonal environment, on-farm handling intensity, transport stocking density, and time in lairage on digestive tract temperature and stress hormone level of market pigs

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Introduction

The present series of studies were conducted to evaluate three seasonal environments: temperate (TMP), cold stress (CS), and heat stress (HS), two on-farm handling intensities: conventional (CONV) and passive (PAS), two transport stocking densities: tight (TSD) and loose (LSD), and two lairage lengths: 45 min and 3 h, on digestive tract temperature and blood plasma cortisol levels.

Materials and Methods

Market hogs at an average live weight of 125 kg were harvested at three environmental situations: TMP, 6 to 13°C, (n =111); CS, - 9 to 0°C (n =113); and HS, 22 to 35°C (n =112). At 16 h prior to harvest, a computer-activated temperature logging device (Ibutton), was placed down the throat of the market hogs. Half of all hogs were randomly subjected to PAS handling and the other half CONV handling, with each group being loaded on trailers with identical dimensions. As each respective handling group was loaded, approximately half of the pigs were allotted to a tight loading density (0.4 m²/per pig) and the other portion to a loose loading density (0.5 m²/per pig). After transport to the harvest facility, half of the test animals within each trailer were randomly allocated to the 45 min or 3 h lairage treatment. Blood collection for subsequent cortisol analysis was made at exsanguination. Ibuttons were collected from the viscera at harvest.

Results and Discussion

Prior to handling, CS pigs had higher temperatures ($P < 0.04$) than pigs from the other two harvests. However, during handling, CONV handled pigs from the HS harvest displayed no difference ($P > 0.40$) in temperature compared to PAS handled pigs from the CS harvest. This suggests that the added activity during CONV handling accelerated the body metabolism of the HS pigs, raising their temperature. During lairage, pigs from the HS harvest had higher ($P = 0.001$) temperatures than pigs from the TMP harvest, which had higher ($P < 0.03$)

temperatures than CS harvested pigs. This suggests the activity associated with the re-establishment of dominance in lairage accelerated the metabolism of the HS pigs. Pigs subjected to the 3 h lairage tended ($P = 0.06$) to have higher temperatures than pigs subjected to the 45 min lairage. Pigs from the HS harvest given a TSD had higher ($P < 0.021$) cortisol levels than TMP and CS pigs at a TSD, as well as HS and CS pigs given a LSD, suggesting a TSD exacerbates heat stress. Pigs from the HS harvest given 3 h of lairage had higher ($P < 0.011$) cortisol levels than TMP pigs given 3 h of lairage; and, HS and TMP pigs given 3 h of lairage had higher ($P < 0.011$) cortisol levels than HS and TMP pigs given 45 min of lairage, suggesting a 3 h lairage exacerbates heat stress.

Summary

The results of this study indicate that during times of heat stress, pigs should be kept in lairage less than 3 h to improve animal welfare. Further study is necessary to determine if pigs maintained in lairage longer than 3 h marginalizes the affects of the seasonal heat stress environment.

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