
CARCASS CHARACTERISTICS OF LARGE WHITE YORKSHIRE GROWER PIGS MAINTAINED UNDER ROOF INSULATION AND WATER FOGGING SYSTEM DURING SUMMER SEASON

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ABSTRACT

A study was carried out to assess the effect of heat stress amelioration practices such as roof insulation and water fogging on the carcass characteristics of Large White Yorkshire grower pigs in summer season. Forty numbers of weaned pigs were assigned to five treatment groups randomly. It was observed that the groups maintained under insulated roofing with 10 and 5 minutes fogging had significantly ($P<0.05$) higher pre slaughter weight, dressing percentage, loin eye area, muscle percentage and meat bone ratio, while hot carcass weight, carcass length and fat percentage were highly significant ($P<0.01$) in these treatments when compared to control.

Key words : Heat stress, Fogging, Enriched roofing, Carcass traits, Large White Yorkshire Pig

INTRODUCTION

One of the most important factors affecting welfare throughout the stages of growth is the environment in which animals are maintained (Nasirahmadi *et al.*, 2015). Pigs raised in tropical climate are always under stress, where the environmental temperatures are frequently above the

zones of thermo neutrality (Myer and Bucklin, 2001). Reduction of heat load in environment is the primary management tool during summer season for most of the productive animals in tropics which are at greatest risk of heat stress and requires most attention. The modified thermal environment usually provides increased productivity (Gangwar, 1988). Therefore, any attempt directed towards the improvement of the managerial practices will yield substantial increase in pork production. The most economic means of reducing heat stress for swine may be through evaporative cooling and modified shelter arrangements, so that the maximum expression of genetic potential of pigs can be achieved. With the above circumstances, the present research work has been taken up

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*Part of M.V.Sc., thesis submitted to Tamil Nadu Veterinary and Animal Sciences University, Chennai - 7

to study the carcass characteristics of Large White Yorkshire pigs raised under enriched housing and water fogging system

MATERIALS AND METHODS

The study was carried out at Post Graduate Research Institute in Animal Sciences, Kattupakkam, TANUVAS, Kancheepuram district in Tamil Nadu. Forty weaned Large White Yorkshire piglets of both sexes at the age group of four months were allotted randomly to five treatment groups and reared with equal floor space allowance of 1m²/piglet under asbestos roofing during the hot months of March to May. T₁ was maintained as control. For T₂ and T₃ treatment groups, the roof was enriched with dry fodder waste and maintained under controlled fogging for 5 and 10 minutes respectively. T₄ and T₅ were maintained under controlled fogging for 5 and 10 minutes respectively. The foggers were having a flow range of 5.5 to 7.5 l/h which sprayed fine water droplets once in 45 minutes period (6 times a day) by automatic timers from 11:00 to 15:00 hrs daily. Two animals from each treatment group were selected at random and slaughtered after the end of the trial for the evaluation of carcass traits, Pigs were kept off feed for a period of 12 hours prior to slaughter but given *ad libidum* access to water. The statistical analysis was carried out by using IBM SPSS® Version 20.0 for Windows®.

RESULTS AND DISCUSSION

The pigs reared under enriched roofing with 5 and 10 minutes of fogging (T₂ and T₃) showed numerically higher pre slaughter live weight of 66.85±0.45 and

66.60±0.10 kg respectively than the control group (61.70±1.30 kg). The results were in agreement with the finding of Gnanaraj *et al.* (2002) and Joshi *et al.* (1997) who had reported heavier live weight in the pigs that were protected from heat stress with cooling system. The hot carcass weight after the slaughter of grower pigs were 41.75±1.25, 46.75±0.25, 48.25±0.25, 45.75±0.25 and 46.50±0.50 kg for T₁, T₂, T₃, T₄ and T₅ groups respectively. Statistical analysis showed highly significant (P<0.01) difference between the five treatment groups. Carcass weight (kg) of pigs of T₃ group maintained under enriched roofing with 10 minutes fogging system (48.25±0.25 kg) was higher, followed by T₂ group under enriched roofing with 5 minutes fogging system (46.75±0.25 kg). This indicated that the pigs under enriched roofing and fogging were able to convert feed into meat better than the pigs kept without any heat stress protection systems. Moreover, the dressing percentage was significantly (P<0.05) higher in T₃ group under enriched roofing with 10 minutes fogging system (72.18±0.86 per cent) when compared to control group (67.65±0.60 per cent). The highest carcass length was recorded in T₃ group under enriched roofing with 10 minutes fogging system (90.75±0.25cm), followed by T₂ group under enriched roofing with 5 minutes fogging system (89.75±0.25 cm), T₅ group under 10 minutes fogging system (89.25±0.25 cm), T₄ group under 5 minutes fogging system (88.75±0.25cm) and least was recorded in control group (86.75±0.75 cm). These results concurred with the findings of Joshi *et al.* (1997). No significant difference in back fat thickness (cm) of Large White Yorkshire grower pigs

maintained under enriched roofing, fogging and control was noticed. The result of the present study was in agreement with that of Wu *et al.* (2016) with regard to effect in back fat thickness. Loin eye area (cm²) was significantly (P<0.01) larger in T₃ group under enriched roofing with 10 minutes fogging system (25.20±0.69cm²), followed by T₂ (23.46±0.01cm²), T₅ (23.25±0.10cm²). Significantly higher loin eye area in the treatment groups under enriched roofing with 5 and 10 minutes fogging point to the suitability of this combined system to provide comfortable environment. Moreover, T₂, T₃, T₄ and T₅ groups had significantly (P<0.05) higher meat percentage compared to the control group. The result of increased meat percentage under cooling system was in agreement with the findings of Bridges *et al.* (1998). Similarly, significantly (P<0.01)

higher fat percentage was observed in T₂, T₃, T₄ and T₅ groups when compared to the control group. The present finding of reduced fat percentage in heat stressed pigs was in agreement with Rinaldo *et al.* (2000) and Bellego *et al.* (2002). However, the statistical analysis of bone percentage had not revealed any significant difference between the five treatment groups. This was in agreement with the findings of Lefaucheur *et al.* (1991). The meat bone ratio was significantly (P<0.05) higher in T₂, T₃, T₄ and T₅ groups (3.93±0.01, 3.97±0.02, 3.98±0.02 and 3.96±0.01) when compared to T₁ group (3.75±0.07). The higher meat bone ratio in the third and second group under enriched roofing and water fogging system points to the possibility of efficient meat production under this heat stress alleviation measure.

Table 1 Mean±SE of various carcass characteristics of Large White Yorkshire grower pigs maintained under enriched roofing and water fogging system

| Carcass character | T ₁ | T ₂ | T ₃ | T ₄ | T ₅ | 'F' value |
|----------------------------------|--------------------------|---------------------------|--------------------------|---------------------------|---------------------------|---------------------|
| Live Weight (kg) | 61.70 ^a ±1.30 | 66.60 ^b ±0.10 | 66.85 ^b ±0.45 | 65.00 ^b ±1.00 | 65.95 ^b ±0.95 | 5.760* |
| Hot carcass weight (kg) | 41.75 ^a ±1.25 | 46.75 ^b ±0.25 | 48.25 ^c ±0.25 | 45.75 ^b ±0.25 | 46.50 ^{bc} ±0.50 | 14.875** |
| Dressing Percentage | 67.65 ^a ±0.60 | 70.19 ^b ±0.27 | 72.18 ^b ±0.86 | 70.40 ^b ±0.70 | 70.51 ^b ±0.26 | 7.636* |
| Carcass length (cm) | 86.75 ^a ±0.75 | 89.75 ^{bc} ±0.25 | 90.75 ^c ±0.25 | 88.75 ^b ±0.25 | 89.25 ^{bc} ±0.25 | 13.538** |
| Back fat thickness (cm) | 3.20 ^a ±0.03 | 3.29 ^b ±0.02 | 3.32 ^b ±0.04 | 3.23 ^{ab} ±0.02 | 3.25 ^{ab} ±0.02 | 3.717 ^{NS} |
| Loin Eye area (cm ²) | 20.88 ^a ±0.93 | 23.46 ^{bc} ±0.01 | 25.20 ^c ±0.69 | 21.80 ^{ab} ±0.15 | 23.25 ^{bc} ±0.10 | 10.122* |
| Meat percentage | 49.82 ^a ±0.05 | 52.08 ^b ±0.68 | 52.23 ^b ±0.06 | 51.80 ^b ±0.06 | 51.51 ^b ±0.02 | 9.848* |
| Bone percentage | 13.30±0.28 | 13.26±0.14 | 13.16±0.04 | 13.01±0.04 | 13.01±0.03 | 0.930 ^{NS} |
| Fat percentage | 31.02 ^a ±0.09 | 33.16 ^c ±0.39 | 33.57 ^c ±0.03 | 32.35 ^b ±0.04 | 33.55 ^c ±0.07 | 34.278** |
| Meat bone ratio | 3.75 ^a ±0.07 | 3.93 ^b ±0.01 | 3.97 ^b ±0.02 | 3.98 ^b ±0.02 | 3.96 ^b ±0.01 | 7.609* |

* Significant at five percent (P<0.05) ; ** Significant at one percent (P<0.01)

Figures having different superscripts in a row differ significantly

CONCLUSION

With the results obtained in the present study, it could be concluded that heat stress control measures such as insulation of roof with dry fodder waste along with 5 or 10 minutes controlled fogging provided beneficial effect on growing pigs in terms of better carcass yield. It also indicated that an intervention in the housing management system by insulating the roof with dry fodder waste and skin wetting with fogging system is the best practice that could be adopted in hot regions as a thermal stress amelioration measure

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