

Heating of piglets: comparison between incandescent light bulbs and infrared FIR panels

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Introduction

The temperature in the farrowing unit is a relevant parameter that greatly affects the welfare of piglets and the related potential risk of mortality (1,2).

The lamps commonly used in farrowing crates work with an incandescent light bulb, which emits radial heat and light. However, some studies suggest that far-infrared radiation (FIR) panels that produce non-ionizing electromagnetic radiation may be more electric-efficient, safe, and may lead to more effective heating of animals compared to the incandescent light bulb (3,4). This is relevant because adequate heating is one of the key factors for decreasing hypothermia and crushing mortality in the first 72 hrs of life (5,6).

The present study aimed to compare the performance of these different heating devices in pig farming, exploring the differences in mortality rates between pig litters exposed to traditional lamps and FIR panels during weaning (7).

Materials and Methods

A total of 175 sows from three different batches were selected for this study from the same pig farm. Half of the sows were housed in farrowing crates heated with an infrared panel, while the other half were housed in crates with an incandescent light bulb heating system. For all the fostering units the room temperature remained in a range between 23 and 23.5°C and cross-fostering was adopted no later than 72h after birth within the same heating system group of study. The collected performance data were: piglets' weight (at birth and weaning), stillborn, mortality, causes of death, sows parity, cross-fostering.

Relationships between mortality rates in litters and the heating device used in the crate were investigated through a mixed logistic regression, including mean weight at birth as a covariate and the batch as a random intercept.

Results

The 175 sows included in the study produced a total of 2371 suckling piglets (13.5 ± 0.2 ES piglets/sow), 189 were then culled, 108 died by crushing, and 185 by other pathological causes, leading to 1997 weaned piglets. Mortality within-litters differed significantly depending on the heating system ($X^2_1=11.4$; $p=0.0007$). Piglets exposed to traditional lamps during weaning had almost twice the odds of dying compared to piglets exposed to FIR panels (OR: 1.76; 95%IC: 1.26 – 2.45; mortality: 9.1% vs 5.4%). Litters housed in crates heated with FIR panels suffered a lower amount of deaths by both crushing and by other pathological causes and had therefore a higher percentage of weaned pigs (88.3% vs 83.1%). Additionally, mortality

was influenced by weight at birth, with litters with higher mean weight showing lower mortality rates ($X^2_1=4.6$; $p=0.032$).

Discussion and Conclusion

Our results show that the FIR panel heating system significantly reduces piglets mortality due to crushing and other pathological causes. To the best of our knowledge, this is the first study on the application of FIR panels in the pig farming industry.

As the number of weaned animals per litter is determinant for the farm economic balance, a lower mortality rate during weaning allows the pig industry to produce more animals and consequently achieve more efficient and profitable husbandry (8). Our findings on the positive relationship between weight at birth and the survival of piglets are consistent with prior research (9,10) and highlight another important point concerning the economical balance and management in the swine industry. In light of the promising results highlighted, the FIR technology shows an interesting potential in the swine industry, and could also be useful in other livestock productions in the future. However, the comparison between traditional lamps and FIR will be further tested in other pig farms in order to consolidate the promising results obtained from this initial research. Moreover, further investigations at the individual level rather than litter level are underway to assess whether FIR panels have also a positive impact on the growth rates of piglets.

References

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