

Title: The impact of pad cooling on barn environment, finishing pig performance and producer profitability - NPB# 13-062

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Scientific Abstract

The objective was to compare barn environment, pig temperature and pig performance of tunnel ventilated finishing barns with cool cell pads (COOLCELL) or without (Control). Barns ($n = 4$) were located at the same site in eastern North Carolina. Data was collected from 2013 to 2016. Each barn had identical dimensions (12.5 m width \times 45.5 m length) with four 1.2 m and one 0.9 m fans on the east end of the barn. Each COOLCELL barn contained cool cell pads (1.2 \times 9.1 m) on the west end of the barn operating between 9am and 9pm (DAY) but not at NIGHT (9pm to 9am). Data loggers 1.4 m above the floor record temperature and relative humidity (RH) every 15 min at 6, 23 and 40 m from the west end of the barn. From each time point, temperature-humidity index (THI) was calculated. Summer 2016, barn wind velocity was recorded with an anemometer, DAY thermal images were captured to assess pig body temperature and cool cell pad temperature, RH, wet bulb temperature, wind velocity and cooling efficiency were captured on the north and south facing pads (2.5, 5.0 and 7.5 m from the water pump). Pig performance measures included average daily gain (ADG), feed efficiency (F:G), livability, percent culls and medication cost. Traits were analyzed using PROC GLM in SAS. Models for barn temperature, RH and THI included fixed effects of year, barn type and time of day. Fixed effects for wind speed included barn type and date. Fixed effects for pig ear temperature (PET) included barn type, date and location within the barn. Compared to Control, COOLCELL temperature was lower ($P < 0.01$), RH was greater ($P < 0.01$) and THI was reduced ($P < 0.01$) during the DAY. Yet at NIGHT, barn environment was similar between the two barn types. Barn wind velocity was greater ($P < 0.05$) for COOLCELL barns when compared to Control (104.6 vs. 94.6 m/min). Average PET was lower ($P < 0.01$) for COOLCELL than Control (37.26 vs. 37.33°C). However, no differences ($P > 0.05$) were detected for maximum PET between COOLCELL and Control (37.72 vs. 37.67°C, respectively), minimum PET (36.41 vs. 36.48°C, respectively) or drop in PET from the base of the head to the tip of the ear (-1.34 vs. -1.20°C, respectively). No differences ($P > 0.05$) in pig performance were detected between COOLCELL and Control for ADG, F:G, livability, percent culls or medication cost. Yet COOLCELL had less ($P < 0.05$) summer medication cost compared to Control but numerically greater F:G during the same time period (2.60 vs. 2.53). While COOLCELL finishing barns reduced summer DAY temperature and THI when compared to Control, no differences were seen in pig performance.

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