

MEAT QUALITY OF PIGS TRANSPORTED TO SLAUGHTER USING TWO NOVEL TRAILER DESIGNS VERSUS A STANDARD POT-BELLY TRAILER UNDER CANADIAN CONDITIONS

K. Moak^{1,2*}, S. Conte², R. Bergeron¹, B. M. Bohrer¹, G. A. Ferreira³, J. Vero³, G. Aboagye⁴, S. Khalife¹, A. Thompson¹, A. M. Bridi³, N. Devillers², and L. Faucitano²,
¹*Animal Biosciences, University of Guelph, Guelph, Ontario, Canada,*
²*Swine Welfare and Behaviour, Agriculture and Agri-Food Canada, Sherbrooke, Canada,*
³*Departamento de Zootecnia, Universidade Estadual de Londrina, Londrina, Brazil,*
⁴*Animal Production, Università di Bologna, Bologna, Italy, *kmoak@uoguelph.ca*

I. OBJECTIVES

This study evaluated and compared effect of 2 novel trailer designs against the current standard North American pot-belly (PB) trailer on meat quality of pigs during short transport under Canadian summer and winter conditions.

II. MATERIALS AND METHODS

A total of 36 loads of pigs (3 trailers, 2 seasons, 6 replicates per trailer design per season) were transported from 9 similar commercial farms to a commercial processing facility located in Southern Ontario (1 h 44 min average trip) over both summer 2019 (July–August) and winter 2020 (January–February). Within each trailer, 9 sentinel cross-bred barrows (27 sentinel pigs per replicate), weighing 130 ± 0.29 kg on average, were randomly selected from the same finishing pen and either allocated to (1) a standard passively ventilated PB featuring internal ramps, (2) a modified PB equipped with fan-assisted ventilation and water drinkers, or (3) a triple flat-deck trailer (designed by Pezzaioli, Italy) equipped with fully hydraulic middle and top deck, fan-assisted ventilation, water misters, an adjustable rooftop compartment, and water drinkers. These sentinel pigs were allocated and mixed with nonsentinel pigs to 3 test compartments in each trailer (3 sentinel pigs/3 compartments/trailer) with an average trailer density of 5.6 ft²/pig in summer and 5 ft²/pig in winter. Meat quality of sentinel pigs was assessed at 24 h postmortem by measuring ultimate pH (pHu) and drip loss in the longissimus muscle, and pHu in the semimembranosus muscle and adductor muscle. Data were analyzed using SAS mixed procedure (SAS Institute Inc., Cary, NC) with the trailer compartment as the experimental unit.

III. RESULTS

The quality of the longissimus muscle was influenced by the trailer type × season and compartment × season interaction, with the pHu value tending to be lower in pigs transported in the modified PB compared to those transported in the Pezzaioli trailer during winter ($P = 0.06$), and drip loss was lower (less exudative) in pigs shipped in the bottom front compartment compared to the middle compartment (1.45% vs. 1.9%) during summer ($P = 0.04$), regardless of trailer type. The pHu of the semi-membranosus and adductor muscles was lower in pigs transported in the middle deck compartment compared to those transported in the top rear compartment of the PB trailer during summer ($P = 0.02$ and $P = 0.04$, respectively). A lower pHu value was found in the adductor muscle of pigs transported in the PB bottom front compartment compared to the top rear compartment during winter ($P = 0.01$).

IV. CONCLUSION

Overall, the results of this study show the negative effect of the compartment location within trailer on meat quality. The loading order and the low deck height may explain the reduced meat quality in pigs transported in the middle and bottom decks, respectively, within the PB trailer. The shared result of the bottom front compartment on pork exudation between all trailers, perhaps due to low deck height impeding sufficient airflow and handling ease, indicates that this compartment may need to be redesigned in all trailers. Both summer and winter had an additive effect on meat quality variation, implying that improving climate control in specific trailer compartments should be made to ensure improved meat quality.

Keywords: meat quality, pigs, season, transport, vehicle design