

Effect of cold pelleting and separation of fine corn particles on growth performance of nursery pigs

C. E. Evans¹, M. Saensukjaroenphon¹, J. C. Woodworth², C. K. Jones², J. M. Derouchey², M. D. Tokach², R. D. Goodband², C. B. Paulk¹, and C. R. Stark¹



¹Department of Grain Science and Industry & ²Department of Animal Sciences and Industry, Kansas State University, Manhattan

Introduction

- Pelleting is a feed processing method shown to improve handling and transportation characteristics of feeds, while reducing segregation and improving feed utilization in swine.
- Typical thermal pelleting requires high pressure steam generated by a boiler to condition feed prior to compression in a vertical ring die.
- Flat die (cold pelleting) technology, however, only utilizes water and rotating pan grinder rollers to create frictional heat to bind particles together.
- No literature exists to compare the standard thermal pelleting process to flat die technology for animal feed.

Objective

The objective of this study was to determine the effects of corn fractionation and pelleting technique on nursery pig growth performance.

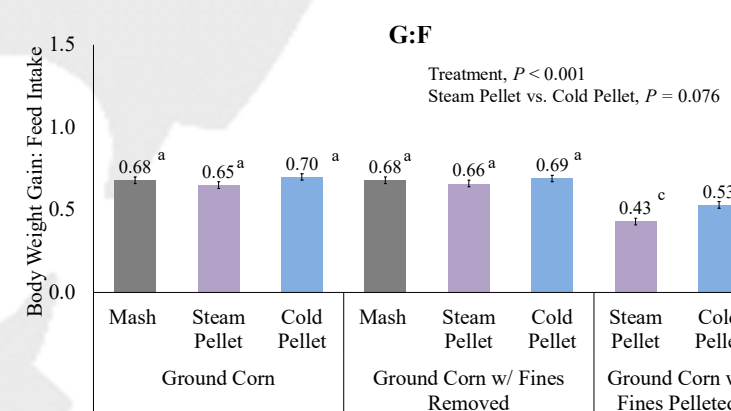
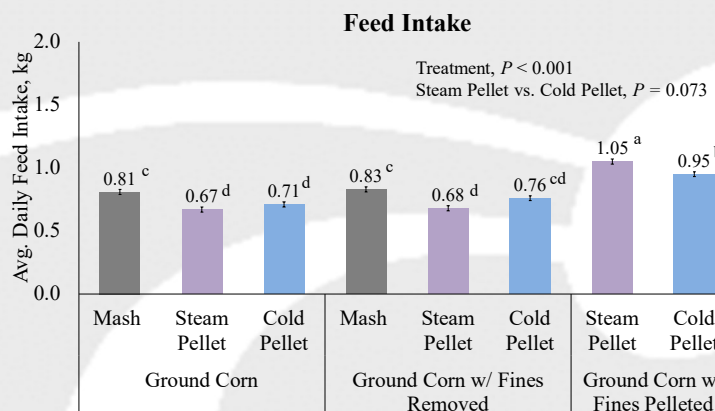
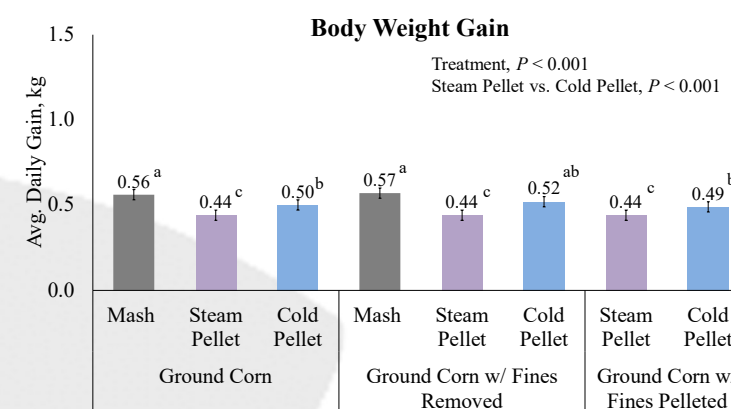
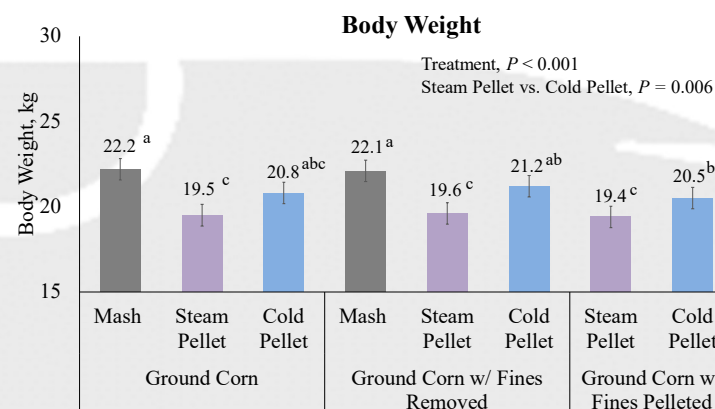
Experimental Procedures

- Barrows (320 DNA 241×600; initially 10.2 kg BW) were placed in groups of 5 and allotted to 8 dietary treatments in a randomized complete block design with 8 replicates per treatment.
- Dietary treatments (8) based on same formulation with varied corn fraction and feed form:
 - 1-3: contained 400 μm ground corn and were fed as either mash, steam pellet, or cold pellet;
 - 4-6: contained 400 μm ground corn with fine corn particles (< 150 μm) removed and were fed as either mash, steam pellet, or cold pellet;
 - 7-8: contained ground corn with only corn fines < 150 μm steam or cold pelleted prior to dietary inclusion without complete diet pelleting.
- Corn was roller milled (RMS Model 924, Sioux Falls, SD) with fine corn particles < 150 μm removed with a rotary horizontal sifter for diets 4-8.
- Steam pellets: mash conditioned for approximately 30 sec at 80°C and pelleted (California Pellet Mill Model #1112-2, Crawfordsville, IN) with a 6.4 mm × 63.5 mm vertical die.
- Cold pellets: mash blended with 4% warm water (54°C) and pelleted (Amandus Kahl Model 33-390, Reinbek, GER) with a 6.4 mm × 35.1 mm horizontal die.
- At day 21, pigs and feeders were weighed to determine BW, ADG, and ADFI, which was then used to calculate the G:F.
- Data were analyzed using the GLIMMIX procedure of SAS (Cary, NC) with 8 replicates per treatment and pre-planned contrasts testing steam pelleting vs. cold pelleting technology.

Diet, as-fed

Item, %	
Corn	62.61
Soybean meal	33.98
Monocalcium P, 21%	1.15
Limestone	0.95
Salt	0.35
L-Lysine HCl	0.30
DL-Methionine	0.12
L-Threonine	0.12
Trace mineral premix	0.15
Vitamin premix	0.25
Phytase	0.02
Total	100.0
Calculated Analysis	
Crude Protein, %	21.7
SID Lys	1.24
Total Lys, %	1.39
ME, kcal/kg	684
SID Lys: ME g/Mcal	3.79
Ca, %	0.70
P, %	0.65
Available P, %	0.43

Results



Summary & Conclusions

- Pigs fed mash diets had improved body weight and ADG compared to those fed steam pelleted diets, with those fed cold pelleted diets being intermediate.
- There was no difference in G:F between pigs fed mash, steam pellet, and cold pellet diets; however, pigs fed diets containing pelleted fines blended with mash had poorer G:F likely due to observed increased feed wastage and sorting behavior.
- There was no difference in growth performance between pigs fed diets with fines removed or not.
- Cold pelleting was a viable option to steam pelleting in the current experiment; however, pelleting reduced pig performance compared to pigs fed mash diets, which was unexpected.
- Further research is needed to validate the response to cold pelleting when the expected response to pelleting using steam conditioning is achieved.

Acknowledgements

Appreciation is expressed to National Pork Board for partial funding of this project and Amandus Kahl for equipment installation and technical support.

